

Off-Campus CATALOG

FRESHMAN AND SOPHOMORE PROGRAMS

1960-61

Science, Education,
and Humanities

Engineering

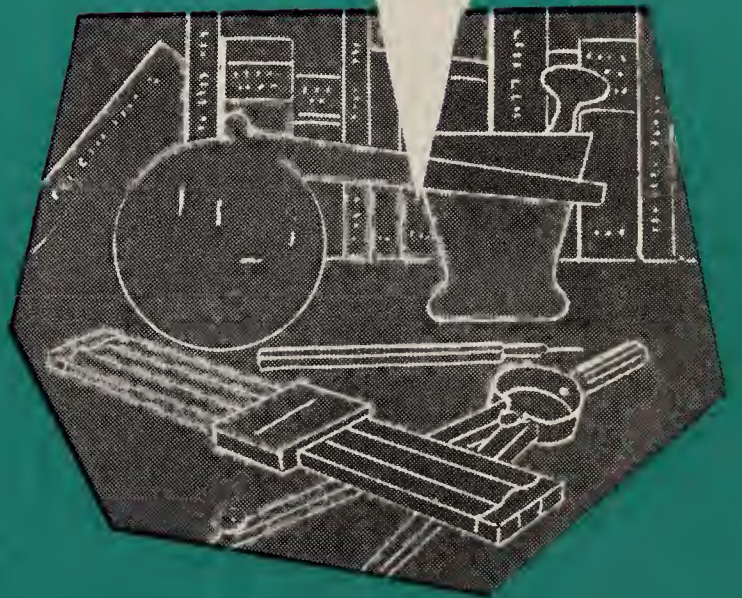
Agriculture

Pharmacy

Home Economics

Veterinary Science
and Medicine

Industrial Management



PURDUE UNIVERSITY BULLETIN

Division of University Centers

OFF-CAMPUS PROGRAM

Announcements for the Year 1960-61

PURDUE UNIVERSITY

Calumet

Fort Wayne

Indianapolis

Michigan City



Eighty-sixth Year

LAFAYETTE, INDIANA

PUBLISHED BY THE UNIVERSITY

Division of University Centers

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CONTENTS

Officers of Administration	2
University Extension Council	4
Department Representatives	5
Off-Campus Program	6
Special Services for Industry.....	6
Requirements for Admission	7
Grades and Honors	9
Fees	11
Correspondence Study	12
Military Training	12
Key to Abbreviations	13
Plans of Study	
Engineering	13
Nontechnical Program	14
Aeronautical	16
Chemical	16
Civil	17
Electrical	17
Mechanical	17
Science, Education, and Humanities.....	18
Bachelor of Arts (All Options).....	18
Biological Sciences, Premedicine, Etc.....	19
Chemistry	19
Mathematics or Physics	20
Physical Education for Men.....	20
Prepharmacy	21
Psychology or Clinical Speech.....	21
Elementary Education Option	22
Industrial Education Option	23
Industrial Management	23
Agriculture	25
General	25
Forestry and Conservation	26
Preveterinary	26
Home Economics	27
Description of Courses	27
School of Agriculture	28
Freshman Engineering	28
School of Chemical Engineering	28
School of Civil Engineering	29
School of Electrical Engineering	29
Division of Engineering Sciences.....	30
Department of Industrial Engineering.....	30
School of Mechanical Engineering	30
School of Metallurgical Engineering	30
School of Home Economics	31
School of Pharmacy	31
School of Science, Education, and Humanities.....	33
School of Industrial Management	44
Instructional Staff	46
Index	50
Addresses of University Centers.....	Outside Back Cover

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1959-60

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PURDUE UNIVERSITY

OFF-CAMPUS PROGRAM

Purdue University, a land-grant institution, extends its programs of study in science, technology, and agriculture through University Centers, which have been established in order to serve better the needs of the people of the state. The off-campus University Centers provide an opportunity for students, in many cases, to live at home and take regular University work. In addition, this state-wide program provides credit and noncredit courses, correspondence instruction, short courses, demonstrations, lectures, conferences, publications, and other formal and informal enterprises for the purpose of making available to the people of the state the educational resources of the University.

Degree Credit Courses. Degree credit courses carry residence credit (with certain limitations on graduate courses) and are identical in quality and content with courses given on the Lafayette campus. All instructors, full- or part-time, are approved by the heads of the various academic schools and departments. Courses are planned and supervised by the schools and departments in the same manner as on campus. Enrollment in a center is enrollment in Purdue.

Noncredit Courses. The University will offer noncredit classes, of an adult nature, which are within the scope of its teaching facilities. Any interested group may request assistance in the development of a course to meet its particular needs. A member of the extension staff will assist with the planning and operation of such a class.

Freshman and Sophomore Programs. Freshman work toward a degree in the schools of Engineering; Science, Education, and Humanities; Industrial Management; Pharmacy; Agriculture; Veterinary Science and Medicine; and Home Economics is offered at all of the off-campus centers. Sophomore programs of work are offered in an increasing number of fields of engineering and science. Students thus may take a substantial proportion of a full four-year degree program at an off-campus center. Inasmuch, however, as the individual centers differ somewhat in size and therefore in the breadth of programs offered, students are urged to consult their school advisors early and make definite plans which will result in transferring to the Lafayette campus at the most logical time.

The courses recommended in the programs of studies which follow constitute a full college load and will require about 23 hours in class each week.

Special Services for Industry

The University Extension Administration is organized to assist businesses and industries in the organization, development, and operation of educational and training programs for work force, technical staff, supervisory, and management personnel. The conduct of surveys, analyses of personnel or educational needs, the organization of formal class instruction, and the development of specific programs of study can be carried out either as a University service or as a cooperative activity with the company. Instruction may be in regular courses

for which degree credit is earned on either the undergraduate or graduate level, or it may be in special noncredit, informal classes. All such services may be limited to the extent that facilities and staff are available. Charges for these services will include the fees assessed for student enrollment in classes and for other services rendered.

At the present time such services are being offered in various locations in the state and include programs for:

Allison Division of General Motors Corporation
 Farnsworth Electronics Corporation
 General Electric Company
 Inland Steel Company
 Magnavox Company
 Radio Corporation of America
 United States Steel Company
 Youngstown Sheet and Tube Company.

Requirements for Admission

All inquiries regarding admission to any of the University Centers should be addressed to the admissions officer of the Center concerned—see address on back of this bulletin.

If high school seniors prepare a first letter of inquiry to the Admissions Office they should state:

- (a) the amount of school training completed,
- (b) their plans for further education, indicating field of specialization,
- (c) the approximate date they wish to enter Purdue,
- (d) a request for information concerning admissions, and
- (e) a request for an application form.

When a prospective Purdue student receives his application form from the Admissions Office or from his high school principal, he should fill it out at the Center or from his high school principal, he should fill it out according to instructions on the form and then submit it to his principal. The principal will complete the application form and forward it to the Admissions Officer of the Center.

High school seniors should file their application forms at the start of their final semester. This enables the University to notify applicants of tentative action before they graduate. It is not advantageous to file sooner than this, however, since the Admissions Office depends primarily on the high school record.

Entrance Requirements

For admission as a regular student in one of the degree programs of study, applicants must satisfy prescribed requirements. Of eight main areas of specialization at Purdue (agriculture; engineering; home economics; science, education, and humanities; pharmacy; physical education for men; industrial management; and industrial education) only physical education dispenses with units of algebra and plane geometry. All require a unit of laboratory science, three units of English, a unit of social studies, a total of not less than 15 units, and finally high

8 • ADMISSION

school graduation. In addition the Engineering Schools require $\frac{1}{2}$ unit of advanced algebra and another $\frac{1}{2}$ unit of trigonometry, and the School of Industrial Management requires a third semester of algebra.

Applicants who intend to earn a degree in pharmacy must qualify for admission to the School of Science, Education, and Humanities for their freshman year of prepharmacy. The high school record should include at least two units of science with laboratory work, preferably biology, chemistry, and physics, in that order.

SCHOOL	High School Graduation	1 Unit Algebra	$\frac{1}{2}$ Unit Advanced Algebra	1 Unit Plane Geometry	$\frac{1}{2}$ Unit Trigonometry	1 Unit Laboratory Science	3 Units English	1 Unit Social Studies	Total of Not Less Than 15 Units
Agriculture	x	x		x		x	x	x	x
Engineering	x	x	x	x	x	x	x	x	x
Home Economics	x	x		x		x	x	x	x
Industrial Management	x	x	x	x		x	x	x	x
Physical Education (Men)	x					x	x	x	x
Applied Technology (2 years)	x	x		x		x	x	x	x
Science, Education, and Humanities*	x	x		x		x	x	x	x
Veterinary Science and Medicine	2 years of prevet curriculum								

*Includes prepharmacy.

Admission with Deficiencies. No student is admitted with deficiencies unless he ranks in the upper third of his graduating class. Such an admission is considered to be conditional pending a satisfactory record at the end of the first year.

A student is not admitted to the Schools of Engineering unless he has completed both one unit of algebra and one unit of plane geometry. Students who meet the entrance requirements except for trigonometry will be considered to have removed this deficiency on passing MA 161 or 152. A trigonometry deficiency may also be removed by completing a noncredit correspondence study course or a credit course in trigonometry (MA 112) which is offered regularly at most of the University Centers. A deficiency in advanced algebra may be removed by a noncredit correspondence study course or by completion of MA 161 or 152.

Temporary Students

Mature persons who desire to avail themselves of the instruction offered in any of the departments of the University without undertaking one of the plans of study and without becoming candidates for degrees may be admitted as temporary students. Such students must present satisfactory evidence that they are prepared to take advantageously the work desired.

Transfer Students

An applicant transferring from another college or university must fulfill the following requirements:

- 1) Submit an application for admission on the prescribed form through the principal of the high school from which he was graduated.
- 2) Forward an official transcript of work done in institutions previously attended. A separate transcript must be sent directly from each institution whether or not credit is requested. If the credentials are not sufficiently definite, a personal consultation with the applicant may be necessary.
- 3) A formal report will be obtained by the director of admissions himself from the dean of men, dean of women, or an authorized official in the school last attended.
- 4) An average of at least one grade higher than the passing grade for all courses previously taken at a recognized college or university is required.

Placement Examinations. New students are required to take the following placement tests: English, physical science, and mathematics. These tests are not entrance examinations.

Where facilities and enrollment in a University Center permit, students may be classified according to their abilities and training. The score on the English placement tests will determine whether a new student is assigned to ENGL 101 or 103. The score on the mathematics placement test will determine whether the new student in engineering or in science (major in mathematics, chemistry, or physics only) will be assigned to MA 151 or 161. Additional information about placement in English and mathematics may be found under the department listing of the courses.

Grades and Honors

Each student will receive a grade for each course in which he is enrolled at the close of a session. The student shall be responsible for the completion of all required work by the time of the last scheduled meeting in the course unless his assignment to the course has been properly cancelled. The grade shall indicate the student's achievement with respect to the objectives of the course. The system is as follows:

For credit courses:

A—highest passing grade.

B

C

D—lowest passing grade; passing minimal objectives of the course.

E—conditional failure; failure to achieve minimal objectives, but only to such limited extent that credit can be obtained by examination or otherwise without repeating the entire course. This grade represents failure in the course unless removed during the following semester.

F—failure to achieve minimal objectives of the course. The student must repeat the course satisfactorily in order to establish credit in it.

10 • SCHOLASTIC PROBATION

For zero-credit courses (including thesis research but not including laboratory portions of courses in which, for purposes of scheduling, separate course designations and separate class cards are used for the laboratory sections):

S—Satisfactory; meets course objectives.

U—unsatisfactory; does not meet course objectives.

For incomplete work, either credit or noncredit:

O—incomplete; no grade; a temporary record of work which was interrupted by unavoidable absence or other causes beyond a student's control and which work was passing at the time it was interrupted. An instructor may require the student to secure the recommendation of the dean of men or the dean of women that the circumstances warrant a grade of incomplete. On the record a grade of O will be equivalent to a W unless the work is completed during the following semester.

Directed grades. The registrar is directed to record the following grades and symbols under special circumstances.

W—withdrew; a record of the fact that a student was enrolled in a course and withdrew or cancelled the course after the last date for late registration and adding courses.

WF—withdrew failing; a record of course cancellation after the last date for cancelling a course without grade, at which time, according to a statement from the instructor, the student was not passing in his work. This grade counts in all respects as a failing grade.

A grade of WF may be directed by the dean of men, the dean of women, or the Committee on Scholastic Delinquency and Readmissions when a student is dropped from a course for serious scholastic delinquency.

V—visitor; a designation in lieu of any other grade for any student enrolled in a course as a visitor without credit.

Scholarship Index. For every student a scholarship index will be computed at the end of each semester.

Distinguished Students. Of the undergraduate students enrolled in curricula leading to degrees, and carrying at least 14 semester hours of assigned work, those whose scholarship index at the end of any regular semester is equal to or greater than 5.50 are designated as distinguished students of that semester.

Scholastic Probation. All undergraduates working toward a degree will be subject to the following probation regulations: to continue in good standing the stated minimum index must be made each semester as freshman—3.2; sophomore—3.4; junior and senior—3.7. Failure to make the required index at the end of a given semester will cause the student to be placed on probation for his next semester. If he is already on probation and fails to make the required index, he will be dropped from the University at the end of that semester. The student may petition the Committee on Readmissions, and if he is permitted to register again, he will do so on probation.

Temporary students and graduate students are exempt from probation regulations. Probation is concerned only with the regular semesters and not with the summer session, summer camps, and intensive courses.

For the purpose of this faculty action a grade of incomplete is considered as passing, and a grade of condition, failure, or unsatisfactory is considered as failing. The action as of the end of the semester must stand even though a condition grade may be removed later.

Termination. A student in engineering whose cumulative index is below 3.50 at the end of his second semester or at any time thereafter will have his status as a student terminated. Effective September 1, 1959, a student in engineering whose cumulative index is less than 3.75 at the end of any semester for which he has been classified as 5 or higher will have his status terminated. Effective May 1, 1960, a student in engineering who passes 20 or more credit hours in excess of the total number required for a baccalaureate degree and yet has not met all requirements for that degree will have his status terminated.

A student in engineering whose status is terminated will not be permitted to register for any future session on the Lafayette campus or in a University Center unless he is reinstated on the basis of a special recommendation by his engineering school head or by an approved change of curriculum request.

Fees

Course Fees. Since catalog copy is, of necessity, prepared several months in advance, fees are subject to change by the Board of Trustees without notice. The current fee schedule is as follows:

- 1. Courses numbered from 100-400—\$15 per credit hour plus \$4 per laboratory hour.
Example: (a) ENGL 101. ENGLISH COMPOSITION I.
Class 3, cr. 3.
 $3 \times \$15 = \$45.$
(b) ZOOL 160. BIOLOGY OF ANIMALS.
Class 3, Lab. 3, cr. 3.
 $(3 \times \$15) + (3 \times \$4) = \$57.$
- 2. Courses numbered 500 and above—\$18 per credit hour plus \$4 per laboratory hour.
Example: (a) MA 521. ADVANCED ENGINEERING MATHEMATICS I.
Class 3, cr. 3.
 $3 \times \$18 = \$54.$
(b) STAT 501. STATISTICAL METHODS.
Class 2, Lab. 2, Cr. 3.
 $(3 \times \$18) + (2 \times \$4) = \$62.$

Breakage Fees. Course fees include the cost of normal breakage and wear and tear on equipment. An additional charge will be levied against individuals for excessive waste, loss, or breakage as may occur. Such special charges must be paid before course credit will be given.

Fees for Special Examinations:

By any student taking the examination to remove a condition..... \$ 5
For advance credit by students who are registered
and paying full fees (12 hours or more) and the date of the examination is after classes start, per course..... \$ 5

12 • MILITARY TRAINING

For advance credit for those who are registered

and not paying full fees (less than 12 hours) and the date of examination is after classes start, per course..... \$25

No fee shall be charged for any student removing a grade of incomplete.

Refunds and Withdrawals. Course fees will be refunded under any one of the following conditions:

1. Withdrawal during first and second weeks of semester, 80 per cent refund.
2. Withdrawal during third and fourth weeks of semester, 60 per cent refund.
3. Withdrawal during fifth and sixth weeks of semester, 40 per cent refund.
4. Withdrawal after sixth week of semester, no refund.

Students who register for a course and do not attend class will be withdrawn as of the first day of class and entitled to a refund of 80 per cent of the course fees paid.

Deposits on equipment are subject to regular service and breakage charges.

Refunds are not transferable from one registration period to another or from one student to another.

To be eligible for a refund the student must notify the off-campus office and apply for a refund at the Center where he is registered at the time of his withdrawal.

Correspondence Study

Training is also given by correspondence study for high school students and recent high school graduates lacking certain subjects required for admission to the University or needing to refresh their knowledge of other courses in preparation for university work. Courses currently available are:

Elementary Algebra I. This course covers the first semester of high school algebra.

Elementary Algebra II. Continuation of the first semester's work.

Advanced Algebra. Begins with a review of the topics studied in a basic course in algebra. In addition, the course includes linear equations, fractional and literal equations, systems of linear equations, radicals, exponents, quadratic equations, and systems of equations involving quadratics.

Plane Geometry I. This course covers the amount of geometry usually taught in the first semester.

Plane Geometry II. Continuation of the first semester's work.

Plane Trigonometry. This course follows the same general plan as that taken on the campus by freshman engineers. The first part includes the use of trigonometric functions in solving triangles with either the natural values of the functions or by means of logarithms. The second part covers analytical trigonometry, including a study of identities, equations, radian measures, and inverse functions.

For information on correspondence study courses write to the address given on the inside front cover.

Military Training

Students enrolled in the University Centers are excused from Basic Military Training required of all male students attending on the Lafayette campus during their freshman and sophomore years, but are required to substitute academic courses of equal credit value. Veterans with one year of military service are

exempt from Basic Military Training and are not required to make academic substitution.

Key To Abbreviations

A&D—Art and Design	ENGR—Engineering	ME—Mechanical
AGEC—Agricultural	ENTM—Entomology	Engineering
Economics	ESC—Engineering	ML—Modern Language
BACT—Bacteriology	Sciences	PEMN—Physical Educa-
BIO—Biology, General	F&N—Foods and	tion for Men
C&T—Clothing and	Nutrition	PEW—Physical Education
Textiles	FOR—Forestry	for Women
CE—Civil Engineering	FR—French	PHIL—Philosophy
CHE—Chemical	GEOL—Geology	PHYS—Physics
Engineering	GER—German	PLSC—Plant Science
CHM—Chemistry	GS—General Studies	PSY—Psychology
ECON—Economics	GVMT—Government	RUSS—Russian
ED—Education	HIST—History	SOC—Sociology
EE—Electrical	HORT—Horticulture	SPAN—Spanish
Engineering	MA—Mathematics	SPE—Speech
ENGL—English		ZOOL—Zoology

PLANS OF STUDY

ENGINEERING

Undergraduate instruction in aeronautical engineering, agricultural engineering, chemical engineering, civil engineering, electrical engineering, engineering sciences, industrial engineering, mechanical engineering, and metallurgical engineering leads to the degree of Bachelor of Science. In order to give the student sufficient time to adjust himself and to choose the branch of engineering for which he is best adapted, the following program of study during the freshman year is common for all engineering curricula. Only those students with adequate background training will be expected to accomplish this in two semesters. Students with inadequate preparation, particularly in mathematics and chemistry, may require an additional semester or summer session to attain sophomore standing. Sophomore plans of study available in some of the fields of engineering are indicated. Plans of study omitted are agricultural engineering, engineering sciences, metallurgical engineering, and industrial engineering. Students planning to pursue these programs should make inquiry to the academic heads of these engineering areas of study.

FRESHMAN YEAR

First Semester		
Course No.	Course Title	Credit
MA 161	Mathematics for Engineers and Scientists I.....	5
ENGL 101	English Composition I	3
or		
SPE 114	Principles of Speech.....	3
CHM 115	General Chemistry	4
CE 118	Engineering Graphics	3
ENGR 100	Freshman Engineering Lectures.....	1
	Nontechnical Elective*	3
		19

* See page 14.

14 • NONTECHNICAL PROGRAM

PEMN 112	Physical Activities	1
SPE 111*	Public Speaking	2
ENGL 185†	Developmental Reading	1

Second Semester

MA 162	Mathematics for Engineers and Scientists II	5
ENGL 101	English Composition I	3
or		
SPE 114	Principles of Speech	3
CHM 116	General Chemistry	4
PHYS 152	Mechanics	4
	Nontechnical Elective†	3
		—
		19
PEMN 112	Physical Activities	1
SPE 112*	Public Speaking	2
ENGL 185†	Developmental Reading	1

NONTECHNICAL PROGRAM

The curricula of the Schools of Engineering provide for a required number of credit hours in a nontechnical program. A minimum of 21 hours of non-technical courses is provided in each curriculum, and these hours are distributed as follows:

- 1. Six credit hours in communications are required in the freshman engineering program. These are ENGL 101 or 103 and SPE 114.
- 2. Six credit hours must be selected from List A which follows. These are specific nontechnical courses in literature, history, philosophy, and the fine arts.
- 3. Six credit hours must be selected from List B. This list includes specific nontechnical courses in the areas of the social sciences and modern languages.
- 4. The remaining credit hours required by each curriculum may be selected from Lists A, B, and C. List C contains specific nontechnical courses of an applied nature but quite different from the technical courses which make up the engineer's basic program.

It should be noted that only a limited number of the courses in the following lists are available at the off-campus Centers at the present time.

List A Humanities

Art and Design: 103, 113, 200, 265, 355, 356, 357, 458.
English: 230, 231, 235, 237, 238, 250, 442, 456, 462, 463, 464, 493, 542, 543, 550, 551, 555, 560, 561, 570, 571, 572, 573, 575, 576, 577, 578, 579, 580, 581, 583, 584.
General Studies: 341, 370, 375, 376, 435, 436.
History: 200, 201, 400, 525.
Philosophy: 250, 306, 310, 311, 320, 513, 514, 517, 518.
Speech: 250, 353, 356.

* SPE 111 and 112 may be substituted for SPE 114 requirement.
† Strongly recommended for all engineering students but not required for graduation.

List B Social Sciences and Modern Languages

Economics: 210, 212, 213, 382, 411, 440, 450, 485, 510, 514, 516, 520, 522, 530, 532, 534, 555, 584.

General Studies: 131*, 132*, 233*, 234*.

Government: 101, 301, 311, 331, 510, 512, 515, 529, 565, 580†, 581†.

History: 204, 205, 210, 405, 410, 450, 451, 505, 507, 535, 545, 555.

Modern Languages‡:

French: 101§, 102, 203, 204, 460, 510, 515, 520, 525, 530, 550, 561.

German: 101§, 102, 203, 204, 244, 460, 515, 516, 517, 518, 520, 530, 550, 561, 562.

Russian: 101§, 102, 203, 204, 243, 244, 560.

Spanish: 101§, 102, 111, 203, 204, 305, 460, 510, 520, 521, 527, 528, 542, 550, 561, 562.

Psychology: 120, 235, 300, 340.

Sociology: 100, 220, 340, 350, 500, 502, 505, 519, 525, 550, 553, 554, 573.

List C General

Art and Design: 259, 260, 264, 361, 365, 366, 369, 370, 402, 590.

Bacteriology: 210.

Civil Engineering: 211, 213, 214.

Economics: 370, 371, 375, 420, 421, 442, 470, 471, 513, 515, 540, 542, 545, 562, 570, 582.

Education: 285, 304.

English: 202, 285, 286, 310, 317, 405, 420, 421, 490, 515.

Forestry: 103, 228, 340, 582.

General Biology: 107.

General Studies: 355.

Geology: 292, 293.

Home Management: 303, 587.

Horticulture: 101, 123, 201.

Plant Sciences: 140, 143.

Psychology: 345, 370, 570, 574, 576, 577, 578.

Sociology: 330, 334, 335, 360, 511, 514, 515, 521, 538.

Speech: 230, 250, 314, 320, 321, 325.

Zoology: 161, 578.

* The sequence GS 131, 132, 233, 234 may be elected as a whole. Students starting this sequence will be required to complete it. If this sequence is taken, credit will not be allowed for GVMT 101, SOC 100, ECON 210, and HIST 205. It is recommended that the above sequence be followed by six hours of philosophy, aesthetics, and fine arts as listed in the general education requirements of the School of Science, Education, and Humanities.

† For those interested in government service.

‡ Students who plan to pursue a program of graduate study are advised to elect a year of German, French, or Russian.

§ Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for these courses without satisfactorily completing a more advanced course in the same language.

AERONAUTICAL ENGINEERING

SOPHOMORE YEAR

First Semester		
Course No.	Course Title	Credit
MA 261	Mathematics for Engineers and Scientists III	4
PHYS 251	Heat, Sound, and Electricity	5
ESC 204	Statics and Kinetics	5
ENGL 202	English Composition II	3
	Nontechnical Elective*	3
		20

It is recommended that students planning to complete the requirements for a degree in aeronautical engineering on the Lafayette campus transfer after completion of third semester work.

CHEMICAL ENGINEERING

SOPHOMORE YEAR

First Semester		
Course No.	Course Title	Credit
CHM 227†	Introductory Quantitative Analysis	4
MA 261	Mathematics for Engineers and Scientists III	4
PHYS 251	Heat, Sound, and Electricity	5
	Nontechnical Electives*	6
		19
Second Semester		
CHE 203	Chemical Engineering Calculations and Elementary Thermodynamics	4
CHM 573†	Physical Chemistry	4
MA 262	Mathematics for Engineers and Scientists IV	4
PHYS 262	Optics and Modern Physics	5
		17

* See page 14.

† One of the following sequences in chemistry must be completed before starting the junior year in chemical engineering.

CHM 117, 126, 227, 573

CHM 115, 116, 226, 227, 573

CHM 100, 103, 116, 226, 227, 573

Thus, off-campus students are advised to plan on coming to the Lafayette campus for a summer session prior to the junior year, if necessary, to complete one of these sequences.

CIVIL ENGINEERING

SOPHOMORE YEAR

First Semester		
Course No.	Course Title	Credit
MA 261	<i>Mathematics for Engineers and Scientists III</i>	4
PHYS 251	<i>Heat, Sound, and Electricity</i>	5
ESC 211*	<i>Statics and Dynamics</i>	4
	Nontechnical Elective†	3
		—
		16

It is recommended that students planning to complete the requirements for a degree in civil engineering on the Lafayette campus transfer after completion of third semester work.

ELECTRICAL ENGINEERING

SOPHOMORE YEAR

First Semester		
Course No.	Course Title	Credit
EE 203	<i>Circuits I</i>	5
MA 261	<i>Mathematics for Engineers and Scientists III</i>	4
PHYS 251	<i>Heat, Sound, and Electricity</i>	5
	Nontechnical Elective†	3
		—
		17
Second Semester		
EE 204	<i>Circuits II</i>	5
MA 262	<i>Mathematics for Engineers and Scientists IV</i>	4
PHYS 262	<i>Optics and Modern Physics</i>	5
	Nontechnical Elective†	3
		—
		17

MECHANICAL ENGINEERING

SOPHOMORE YEAR

First Semester		
Course No.	Course Title	Credit
ENGL 202‡	<i>English Composition II</i>	3
ESC 204	<i>Statics and Kinetics</i>	5
MA 261	<i>Mathematics for Engineers and Scientists III</i>	4
PHYS 251	<i>Heat, Sound, and Electricity</i>	5
		—
		17

* ESC 204 may be substituted for ESC 211.
† See page 14.
‡ A student who receives a grade of A in ENGL 101 may, with the approval of his counselor, substitute for ENGL 202 an elective course in English.

Second Semester		
ME 230	Energy Conversion	3
ME 260	Mechanisms	3
MA 262	Mathematics for Engineers and Scientists IV	4
PHYS 262	Optics and Modern Physics	5
	Nontechnical Elective*	3
		—
		18

NOTE: Students planning to enter engineering sciences, industrial engineering, or metallurgical engineering should transfer to the Lafayette campus upon completion of the freshman year's work.

SCIENCE, EDUCATION, AND HUMANITIES

Two new programs leading to the degrees of Bachelor of Arts and Bachelor of Science are planned for students entering the University Centers on or after September 1959. The program leading to the degree Bachelor of Science should be followed by students majoring in any of the various fields of science, including mathematics, psychology, and clinical speech, or in high school teaching in any of these fields. The program leading to the degree Bachelor of Arts should be followed by students majoring in any of the fields of humanities or social sciences (except psychology), in high school teaching in any of these fields, in preparation for a career in business, industry, or recreation leadership, or by women students preparing to teaching physical education.

BACHELOR OF ARTS (All Options)
FRESHMAN YEAR

First Semester		
Course No.	Course Title	Credit
BIO 103†	Principles of Biology I	3
ENGL 101	English Composition I	3
MA 121	General College Mathematics I	3
	Modern Language	3
	Social Science	3
	Physical Education or Elective	2-3
		—
		17-18
Second Semester		
BIO 104†	Principles of Biology II	3
SPE 116	Fundamentals of Expression	3
MA 122	General College Mathematics II	3
	Modern Language	3
	Social Science	3
ENGL 185	Developmental Reading	1
	Physical Education or Elective	1-3
		—
		17-19

* See page 14.
† ZOOL 160 and PLSC 140 may be substituted for the BIO 103-104 sequence.

BIOLOGICAL SCIENCES, PREMEDICINE,
AND PREDENTISTRY

First Semester

Course No.	Course Title	Credit
ZOOL 161*	General Zoology	4
CHM 111	General Chemistry	3
ENGL 101	English Composition I	3
MA 121	General College Mathematics I	3
	Modern Language (German or Russian recommended)...	3
	Physical Education or Elective	2-3
		18-19

Second Semester

PLSC 140	Introduction to Plant Life	4
CHM 112	General Chemistry	3
SPE 116	Fundamentals of Expression	3
MA 122	General College Mathematics II	3
	Modern Language	3
ENGL 185	Developmental Reading	1
	Physical Education or Elective	1-3
		18-20

CHEMISTRY

First Semester

Course No.	Course Title	Credit
CHM 115	General Chemistry or CHM 117 (Advanced General Chemistry)	4-5
ENGL 101	English Composition I	3
	Social Science	3
MA 161	Mathematics for Engineering and the Physical Sciences I...	5
	Physical Education or Elective	2-3
		17-19

Second Semester

CHM 116	General Chemistry or CHM 126 (Advanced General Chemistry with Qualitative Analysis)	4-5
SPE 116	Fundamentals of Expression	3
	Social Science	3
MA 162	Mathematics for Engineering and the Physical Sciences II	5
ENG 185	Developmental Reading	1
	Physical Education or Elective	1-3
		17-20

* ZOOL 160 may be substituted for ZOOL 161.

MATHEMATICS OR PHYSICS

First Semester

Course No.	Course Title	Credit
ENGL 101	English Composition I	3
ENGL 185	Developmental Reading	1
	Social Science	3
MA 161	Mathematics for Engineering and the Physical Sciences I.	5
SPE 116	Fundamentals of Expression	3
	Physical Education or Elective	2-3
		17-18

Second Semester

ENGL 202	English Composition II	3
	Social Science	3
MA 162	Mathematics for Engineering and the Physical Sciences II	5
PHYS 152	Mechanics	4
	Physical Education or Elective	1-3
		16-18

PHYSICAL EDUCATION FOR MEN—
COACHING AND TEACHING OPTION

First Semester

Course No.	Course Title	Credit
ZOOL 160	Biology of Animals	4
PEMN 105	Physical Education: Orientation and History.....	2
PEMN 103	Physical Education Curricular Activities.....	3
SOC 100	Introductory Sociology	3
ENGL 101	English Composition I	3
PEMN 151	Sports Officiating	2
PEMN 112	Physical Activities	1
		18

Second Semester

PLSC 140	Introduction to Plant Life	4
PEMN 104	Physical Education Curricular Activities	3
PSY 120	Elementary Psychology	3
SPE 114	Principles of Speech	3
PEMN 307	Principles of Coaching Basketball, Track	3
ENGL 185	Developmental Reading	1
PEMN 112	Physical Activities	1
		18

PREPHARMACY

First Semester

Course No.	Course Title	Credit
CHM 109	General Chemistry	4
ENGL 101	English Composition I	3
MA 121	General College Mathematics	3
or		
MA 111	College Algebra	3
	Military Training, Physical Education, or Elective	2
SOC 100	Introductory Sociology	3
ENGL 185	Developmental Reading	1
PHAR 100	Pharmacy Orientation	1
		17

Second Semester

CHM 110	General Chemistry with Qualitative Analysis	4
SPE 116	Fundamentals of Expression	3
MA 122	General College Mathematics II	3
or		
MA 112	Trigonometry	3
PSY 120	Elementary Psychology	3
ENGL 285	Reading for Comprehension	1
	Military Training, Physical Education, or Elective	2
		16

PSYCHOLOGY OR CLINICAL SPEECH

First Semester

Course No.	Course Title	Credit
BIO 103*	Principles of Biology I	3
ENGL 101	English Composition I	3
	Social Science	3
MA 121	Social Science	3
SPE 116	Fundamentals of Expression	3
	Physical Education or Elective	2-3
		17-18

Second Semester

BIO 104*	Principles of Biology II	3
ENGL 202	English Composition II	3
ENGL 185	Developmental Reading	1
	Social Science	3
MA 122	General College Mathematics II	3
PSY 120	Elementary Psychology	3
	Physical Education or Elective	1-3
		17-19

* ZOOL 160 and PLSC 140 may be substituted for the BIO 103-104 sequence.

ELEMENTARY EDUCATION OPTION

Preparation in elementary school teaching is now offered in the Division of Education of the School of Science, Education, and Humanities at Purdue University. This constitutes a program approved by the Indiana Commission on Teacher Training and Licensing.

Students who expect to complete work for an area of concentration in elementary teacher education in the School of Science, Education, and Humanities may take a year of courses in an off-campus Center including the following required courses or approved substitutes:

MA 121, 122	6	hours
ENGL 101, 230, 185	6 ² / ₃	hours
SPE 114	3	hours
GVMT 301	3	hours
SOC 100	3	hours
ML 101, 102	6	hours
PSY 120	3	hours
PEW 100 or PEMN	2	hours

Admission to the program should be completed by the student as early as possible upon enrolling in the University. Admission to the University does not insure admission to elementary education. Counselling in elementary education from the campus will be available to students from time to time at the off-campus Centers.

The Division of Education at Purdue is interested in preparing only elementary school teachers of high quality. Therefore, applicants will be admitted to the elementary teaching courses on the basis of above-average scholarship, leadership qualities, good mental and physical health, and positive attitudes toward teaching as a profession. The Division of Education expects to be selective in both admission and retention of students for elementary school teaching.

- Scholarship record—including transcript of high school work as well as Purdue record. This information will be obtained from the application for admission which all students submit prior to admission to Purdue University.
- Health information—including evidence of good physical health. This information will be secured from the physical examination report which all students submit prior to admission to Purdue University.
- Test data—including Purdue orientation tests and additional tests to be given to all students interested in elementary teaching. Time and place of examinations will be announced from time to time.
- Application form and interview—statement on leadership activities in high school, experience with young children, and motivation for teaching. Students will provide this information by personal data sheets.

INDUSTRIAL EDUCATION OPTION

The four-year curriculum in industrial education which leads to the degree of Bachelor of Science in Industrial Education is designed to prepare the student to qualify in one of the following fields: (1) vocational industrial teaching, (2) industrial arts, (3) industrial training. Completion of this curriculum also fulfills the professional training requirements specified by the Indiana State Teacher Training and Licensing Commission. Individuals with qualified industrial experience may request an evaluation of it for credit purposes.

In order to achieve any of these objectives, each student is required to complete a basic curriculum which includes the subjects listed below. Provision is then made for majoring in one of the subject-matter fields.

FRESHMAN YEAR

First Semester

Course No.	Course Title	Credit
MA 111*	Algebra	3
ENGL 101	English Composition I	3
GVMT 301	Elements of Democracy	3
CHM 111	General Chemistry	3
SPE 114	Principles of Speech	3
		—
		15

Second Semester

MA 112*	Trigonometry	3
SOC 100	Introductory Sociology	3
CHM 112	General Chemistry	3
PSY 120	Elementary Psychology	3
ENGL 202	English Composition II	3
		—
		15

INDUSTRIAL MANAGEMENT

The curriculum leading to the degree of Bachelor of Science in Industrial Management is designed to combine training in basic management techniques with a good background in modern science and technology. The program includes two approximately equal sequences, one in economics and industrial management, the other a "technical sequence." The balance of the program is devoted to general education, including communication, literature, philosophy, social studies, and electives.

The management subjects covered include accounting, financial control, financial management, industrial marketing, production management, industrial relations, quantitative methods in industry, and business policy.

* If MA 111 and 112 are not offered, MA 121 and 122 may be substituted,

24 • PLANS OF STUDY

The most commonly chosen technical sequences are in engineering or applied statistics; others may be approved when appropriate to a student's needs. These provide for one advanced course in each of the last four semesters, based on the science and mathematics prerequisites taken in the first two years. Such a program will help industrial managers keep abreast of scientific developments and be better able to understand and cooperate with the technical specialists with whom they will work.

FRESHMAN YEAR

First Semester

Course No.	Course Title	Credit
MA 151*	<i>Elementary Mathematics for Engineers and Scientists I</i>	5
ENGL 101	<i>English Composition I</i>	3
or		
SPE 114	<i>Principles of Speech</i>	3
CHM 115	<i>General Chemistry</i>	4
GVMT 301	<i>Elements of Democracy</i>	3
ENGL 185	<i>Developmental Reading</i>	1
		—
		16
ENGL 230	<i>Introduction to Literature</i>	3
	<i>Modern Language</i>	3

Second Semester

MA 152	<i>Elementary Mathematics for Engineers and Scientists II</i> ..	5
ENGL 101	<i>English Composition I</i>	3
or		
SPE 114	<i>Principles of Speech</i>	3
CHM 116	<i>General Chemistry</i>	4
HIST 205	<i>United States and Its Place in World Affairs</i>	3
	<i>Elective</i>	3
		—
		18
ENGL 202	<i>English Composition II</i>	3
CE 118	<i>Engineering Graphics</i>	3
	<i>Modern Language</i>	3

* Qualified students should take MA 161 and MA 162 in place of MA 151 and 152. MA 161 with a grade of C or better will count ten hours toward graduation requirements.

AGRICULTURE

The School of Agriculture trains students in many types of agricultural work, including not only farming but also related educational and industrial activities. Programs of study are offered in forestry and conservation. Twelve departments in the School of Agriculture offer optional programs preparing students for jobs in research, teaching, and extension, as well as in various related commercial enterprises. Instructional work is based on fundamental training in biology, chemistry, and physics, together with courses in history, economics, English, psychology, and other similar fields.

GENERAL OPTION

FRESHMAN YEAR

First Semester

Course No.	Course Title	Credit
ENGL 101	<i>English Composition I</i>	3
CHM 111	<i>General Chemistry</i>	3
ZOOL 160	<i>Biology of Animals</i>	4
AGEC 100	<i>Introduction to Agricultural Economics</i>	3
MA 111	<i>Algebra</i>	3
		—
		16
CHM 115	<i>General Chemistry</i>	4
HIST 205	<i>The U. S. and Its Place in World Affairs</i>	3
PEMN 112	<i>Physical Activities</i>	1

Second Semester

SPE 114	<i>Principles of Speech</i>	3
CHM 112	<i>General Chemistry</i>	3
GVMT 301	<i>Elements of Democracy</i>	3
PLSC 140	<i>Introduction to Plant Life</i>	4
FOR 103	<i>Conservation</i>	2 or 3
ENTM 100	<i>Introduction to Entomology</i>	3
		—
		18-19
ENGL 238	<i>Introduction to Fiction</i>	3
MA 112	<i>Trigonometry</i>	3
CHM 116	<i>General Chemistry</i>	4
PSY 120	<i>Elementary Psychology</i>	3
PEMN 112	<i>Physical Activities</i>	1

FORESTRY AND CONSERVATION OPTION

The two programs available in forestry and conservation are designed to train students for either the management of nonagricultural lands or for the opportunities in the conversion, manufacture, and use of wood. Professional instruction is based upon broad training in fundamental concepts and thorough background in biological and physical science.

FRESHMAN YEAR		First Semester	
Course No.		Course Title	Credit
PLSC 140		<i>Introduction to Plant Science</i>	4
CHM 111		<i>General Chemistry</i>	3
ENGL 101		<i>English Composition I</i>	3
MA 111		<i>Algebra</i>	3
FOR 103		<i>Conservation</i>	2 or 3
			15-16
		Second Semester	
ZOOL 160		<i>Biology of Animals</i>	4
CHM 112		<i>General Chemistry</i>	3
ENGL 202		<i>English Composition II</i>	3
MA 112		<i>Trigonometry</i>	3
ECON 210		<i>Principles of Economics</i>	3
			16

PREVETERINARY OPTION

The program of study leading to the degree of Doctor of Veterinary Medicine is divided into two parts. Students are expected to prepare for professional level work by completing two years of a preveterinary program. After acceptance into the professional-level program, an additional four years is required.

FRESHMAN YEAR		First Semester	
Course No.		Course Title	Credit
		<i>English Composition</i>	3
ENGL 101		<i>General Chemistry</i>	3
CHM 111		<i>Biology of Animals</i>	4
ZOOL 160		<i>Algebra</i>	3
MA 111		<i>Elective*</i>	3
			16
		Second Semester	
ENGL 202		<i>English Composition II</i>	3
CHM 112		<i>General Chemistry</i>	3
PLSC 140		<i>Introduction to Plant Life</i>	4
MA 112†		<i>Trigonometry</i>	3
		<i>Elective*</i>	3
			16

* Preveterinary electives shall be selected from not less than two of the following fields: modern language, economics, government, history, philosophy, psychology, and sociology.

† If MA 111 is not scheduled in the first semester, it should be assigned in the second semester.

HOME ECONOMICS

The plan of study in home economics is designed to prepare young men and women for professional work in the various areas of the field and at the same time to provide a broad general education which prepares the student to meet the needs for home and community living.

Areas of concentration include art and design, child development (nursery-kindergarten), clothing and textiles, foods and nutrition, food management, foods in business, food research, home economics extension, housing, and vocational home economics teaching.

Students interested in preparation for work in the fields mentioned above should enroll in the curriculum listed below.

FRESHMAN YEAR

First Semester		
Course No.	Course Title	Credit
ENGL 101	English Composition	3
CHM 111	General Chemistry	3
MA 111*	Algebra	3
SOC 100	Introductory Sociology	3
C&T 102	Clothing I	4
		16

Second Semester		
ENGL 202	Introduction to Fiction	3
SPE 114	Public Speaking	3
CHM 112	General Chemistry	3
GVMT 301	Elements of Democracy	3
PSY 120	Elementary Psychology	3
		15

DESCRIPTION OF COURSES

Courses numbered 1 to 499 are primarily for undergraduate students. Courses numbered 500 to 599 are for undergraduates (usually juniors and seniors) and graduate students. Courses numbered 600 and above are for graduate students.

For each course the first line of the description should be interpreted as follows: first, the official number of the course; second, its special title; and third, the number of class, laboratory, and credit hours. Under Agronomy, for example, the following line:

105. CROP PRODUCTION. Class 2, Lab. 2,
cr. 3.

indicates that the course AGRY 105, Crop Production, meets two hours each week for lecture, recitation, or class discussion, has a laboratory period of two hours each week, and yields three semester hours of credit.

* If MA 111 and 112 are not offered, MA 121 and 122 may be substituted.

AGRICULTURAL ECONOMICS

Professor Hardin in charge

100. **INTRODUCTION TO AGRICULTURAL BUSINESS ECONOMICS.** Class 3, cr. 3.

Farm financial records, analysis of the farm business; factors affecting farm profits; agricultural geography; types of farming; and current problems in agricultural economics.

AGRONOMY

Professor Peterson in charge

105. **CROP PRODUCTION.** Class 2, Lab. 2, cr. 3.

Fundamental principles in crop production, distribution, rotations, soil relations; grain and forage crops, adaptation, characteristics, varieties, harvesting, storage, and marketing.

255. **SOIL MANAGEMENT.** Class 2, Lab. 2, cr. 3. Must be preceded by CHM 101, 111, or 117.

Soil management and fertility. Designed for students taking only one course in soils.

ANIMAL SCIENCE

Professor Harper in charge

261. **FEEDS AND FEEDING.** Class 3, cr. 3. Must be preceded by CHM 101 and 102, or 111 and 112, or 117 and 118.

Fundamental principles of animal nutrition.

100. **FRESHMAN ENGINEERING LECTURES.** Class 1, cr. 1.

An introduction to the engineering profession.

SCHOOL OF AGRICULTURE

Dean Butz in charge

DAIRY

Professor Gregory in charge

105. **INTRODUCTION TO DAIRY MANUFACTURES.** Class 2, Lab. 2, cr. 3. A survey of the dairy manufactures field. The fundamentals of processing market milk and manufacturing butter, cheese, concentrated milks, ice cream, and powdered milk. Applications of science to the manufacture of dairy products.

ENTOMOLOGY

Professor Davis in charge

100. **INTRODUCTORY ENTOMOLOGY.** Class 2, Lab. 2, cr. 3.

The structure, biology, and classification of insects and the principles of insect control.

FORESTRY

Professor Bramble in charge

103. **CONSERVATION.** Class 2, cr. 2, or Class 2, Lab. 2, cr. 3.

Development and use of natural resources, with special emphasis on renewable natural resources. Lectures. Directed program of supplemental reading for additional credit.

HORTICULTURE

Professor Stevenson in charge

318. **GENERAL HORTICULTURE.** Class 3, cr. 3.

Of special interest to students who want one three credit-hour course in the various fields of horticulture. Not to be taken by students who have credit in HORT 207 or 308.

FRESHMAN ENGINEERING

Professor Spalding in charge

SCHOOL OF CHEMICAL ENGINEERING

Professor Golding in charge

203. **CHEMICAL ENGINEERING CALCULATIONS AND ELEMENTARY THERMODYNAMICS.** Class 3, Problem Lab. 2, cr. 4. Must be preceded by CHM 117 and 126 or equivalent and accompanied or preceded by MA 261 and PHYS 251.

Material, heat, and energy balances applied to batch and continuous chemical processes; thermodynamic concepts of energy, heat, work, system, state, and process; the first law of thermodynamics; properties and behavior of perfect gases.

SCHOOL OF CIVIL ENGINEERING

Professor Woods in charge

- 110. DRAFTING FUNDAMENTALS.** Class 1, Lab. 6, cr. 3.

A basic course in drawing; orthographic projection, pictorial sketching, print reading, and reproduction of drawings. Problems designed to require practical reasoning and develop good techniques. Designed for teachers of drawing.

- 111. ADVANCED DRAFTING.** Class 1, Lab. 6, cr. 3.

Continuation of CE 110. Preparation of assembly and detail drawings, including fasteners, limit dimensioning, and shop notes. Intersections and developments with sheet metal pattern applications. Symbols and construction details used in architectural drafting. Designed for teachers of drawing.

- 113. SLIDE RULES AND GRAPHS.** Lab. 2, cr. 1. Must be preceded or accompanied by MA 112 or 151.

Principles and use of the slide rule for division, multiplication, trigonometry, powers, and roots. Properties and types of coordinate graphs for scientific and engineering purposes; calculation and plotting graphs: uniform, log, semi-log, and others.

- 118. ENGINEERING GRAPHICS.** Class 1, Lab. 6, cr. 3. Must be preceded or accompanied by MA 152 or 161.

Graphical methods used in engineering design, layout, and calculation. Multiview and pictorial drawing and sketching of technical objects; basic dimensioning practice; conventional representation.

- 218. DESCRIPTIVE GEOMETRY FOR ENGINEERS.** Class 1, Lab. 3, cr. 2. Must

be preceded by CE 118 and preceded or accompanied by MA 261.

Relations of points, lines, and planes and their graphical and algebraic representations; graphical solutions; and associations with algebraic solutions of theoretical and practical problems.

- 292. PHYSICAL GEOLOGY.** Class 2, Lab. 3, cr. 3. (This course is the same as GEOL 292.)

Geologic processes and the development of land forms. Laboratory covers the study of minerals and rocks, the interpretation of topographic and geologic maps, and field trips.

- 293. HISTORICAL GEOLOGY.** Class 2, cr. 2. (This course is the same as GEOL 293.)

The history of the earth, including its origin, architecture, and the development of its structures. Study of the rock record and the evolution of life. Several field trips are taken during the semester.

- 317. PRODUCTION ILLUSTRATION.** Lab. 6, or Class 1, Lab. 6, cr. 2 or 3. Must be preceded by CE 118.

To give the student a good knowledge of and some experience in the graphical construction and some rendering techniques necessary to produce accurate pictorial drawings suitable for catalogs, production planning, and design analysis.

- 502. LAND SURVEYING.** Class 3, cr. 3. Must be preceded by CE 201.

United States' system of public land surveys; legal aspects; plats; boundary control; systems used to describe property. The surveyor—his duties and liability.

SCHOOL OF ELECTRICAL ENGINEERING

Professor Jones in charge

- 203. CIRCUITS I.** Class 4, Lab. 3, cr. 5. Must be preceded or accompanied by MA 261 and PHYS 261.

Fundamental properties of electric and magnetic circuits. Basic concepts, circuit elements, and source functions. Response of simple circuits. Transformations. Sinusoidal steady-state analysis.

- 204. CIRCUITS II.** Class 4, Lab. 3, cr. 5. Must be preceded by EE 203 and preceded or accompanied by MA 262.

Continuation of EE 203. The complex-frequency plane, impedance and admittance functions, network analysis and theorems, nonsinusoidal periodic functions.

30 • DESCRIPTION OF COURSES

461. **ILLUMINATION ENGINEERING.** Class 3, cr. 3. Must be preceded by EE 301.

Spectroradiometric and luminosity functions, illumination entities and units, source characteristics, illumination meas-

urements and calculations, lighting applications, elementary designs, and costs.

551. **ADVANCED ELECTRONIC CIRCUITS.** Class 3, cr. 3.

Engineering extension course for Fort Wayne graduate program.

DIVISION OF ENGINEERING SCIENCES

Professor Trabant in charge

204. **STATICS AND KINETICS.** Class 5, cr. 5. Must be preceded by PHYS 152 or equivalent and preceded or accompanied by MA 261.

Statics: forces, vectors, moments, equilibrium, friction, centers of gravity, and moments of inertia.

Kinetics: force, mass, acceleration, velocity, inertia, work energy, power, impulse, and momentum.

211. **STATICS AND DYNAMICS.** Class 4, cr. 4. Must be preceded by PHYS 152 and preceded or accompanied by MA 261.

Composition and resolution of force systems; equilibrium of force systems; friction; centroids; moments of inertia; virtual work; kinematics; kinetics; impulse and momentum; vibrations.

312. **MECHANICS OF MATERIALS.** Class 4, cr. 4. Must be preceded by ESC 204 and MA 261.

Stress and strain: properties of materials; torsion; shear and moment; bending and deflection of beams; statically indeterminate beams; combined stresses; columns.

DEPARTMENT OF INDUSTRIAL ENGINEERING

Professor Amrine in charge

365. **ORGANIZATION FOR PRODUCTION.** Class 3, cr. 3. Must be preceded by MA 262.

Basic course in industrial engineering, introducing the functions of plant layout, production planning and control, quality control, cost control, motion and time study, industrial organization, and employee relations.

477. **WORK METHODS AND MEASUREMENT.** Class 3, cr. 3. Must be preceded by IE 365 and preceded by or accompanied by IE 345.

Work analysis; principles and techniques of motion study; nature of human work; design of work methods; work measurement; ratio-delay; predetermined time systems.

SCHOOL OF MECHANICAL ENGINEERING

Professor Chenea in charge

230. **ENERGY CONVERSION.** Class 3, cr. 3. Must be preceded by CHM 116, MA 261, ME 280, PHYS 251.

Dimensions and units; matter and energy; introduction to the principles of thermodynamics, heat transfer, and fluid dynamics; fuels and combustion; nuclear energy; applications of heat exchangers, power generation, refrigeration, propulsion, and fluid transfer.

260. **MECHANISM.** Class 2, Lab. 3, cr. 3. Must be preceded by CE 219, ESC 204, and ME 280.

Motions and velocities of machine parts.

500. **THERMODYNAMICS.** Class 3, cr. 3. Must be preceded by ME 301 and MA 421 or 422.

A more extended treatment of the fundamentals of thermodynamics, including thermochemistry, chemical equilibrium, and real gases.

SCHOOL OF METALLURGICAL ENGINEERING

Professor Schuhmann in charge

201. **METALLURGICAL CALCULATIONS.** Class 3, cr. 3. Must be preceded by CHM 115 and 116 or equivalent, and accompanied or preceded by MA 261 and PHYS 251.

Heat and material balances associated with metallurgical processes and lecture discussion of professional problems.

SCHOOL OF HOME ECONOMICS

Dean Gillaspie in charge

ART AND DESIGN

Professor Calkin in charge

355. ART APPRECIATION. Class 3, cr. 3.

CHILD DEVELOPMENT AND FAMILY LIFE

Professor Murphy in charge

209. FAMILY HEALTH. Class 2, Lab. 1, cr. 2 (Lab. for 5 weeks only).

Lectures and demonstrations on the fundamental principles of nursing in the home, disease prevention, and maternal and infant care.

350. MARRIAGE AND FAMILY RELATIONSHIPS. Class 3, cr. 3.

Designed to provide further understanding of family relationships for those unmarried, those contemplating marriage, those married, and prospective counselors of all of them. A functional approach to the interpersonal relationships of courtship, marriage, and family life. Open to both men and women.

CLOTHING AND TEXTILES

Professor Davis in charge

102. CLOTHING I. Class 2, Lab. 6, cr. 4.

Aesthetic and economic factors in the selection of clothing designs, fabrics, and colors for individuals; experience in the use of commercial patterns and a variety of construction techniques; textile study in relation to consumer buying and care.

EQUIPMENT AND FAMILY HOUSING

Professor Johnston in charge

226. HOUSING THE FAMILY. Class 3, cr. 3, Must be preceded by A&D 113.

Planning and choice of homes and furnishings.

FOODS AND NUTRITION

Professor Vail in charge

303. ESSENTIALS OF NUTRITION. Class 3, cr. 3. No prerequisites. For students not majoring in home economics.

Selection of foods to meet nutritional needs.

313. FAMILY FOOD PURCHASING. Class 2, Lab. 3, cr. 3. Must be preceded by F&N 205.

Varieties, standards, grades, brands, qualities of food products; factors governing costs, food legislation.

HOME MANAGEMENT AND FAMILY ECONOMICS

Professor Fitzsimmons in charge

303. OPERATING THE HOUSEHOLD. Class 2, cr. 2. For students not majoring in home economics.

Elements of marketing and budgeting; choice and care of equipment and other furnishings; laundry and cleaning methods; motion and time saving at daily tasks; food management.

INSTITUTIONAL MANAGEMENT

Professor Reynolds in charge

536. SCHOOL LUNCHROOM MANAGEMENT. Class 3, cr. 3. For graduates in home economics who are managing lunchrooms and who have had courses in foods and nutrition approved by the department.

Survey of school lunchroom problems; menu planning; purchase, preparation, and service of food; records; management; equipment.

SCHOOL OF PHARMACY

Dean Jenkins in charge

Prepharmacy Year. Students who expect to complete work for a degree in the School of Pharmacy should take a year of prepharmacy courses (School of Science, Education, and Humanities, prepharmacy option) followed by a four-year program of professional courses in the School of Pharmacy.

The five-year program at Purdue will consist of one year of prepharmacy and four years of professional instruction. Students who carefully plan and

32 • DESCRIPTION OF COURSES

select appropriate courses may take one, or in special cases, two years of the curriculum in University Centers or other colleges. The five-year curriculum provides for the selection of an optional program after completion of the first three years; namely, a professional option in preparation for general practice or a scientific option in preparation for industry, research, and teaching. Students who meet the requirements of the Graduate School may be permitted to gain up to 18 credit hours toward the M.S. degree for approved work taken in the fifth year.

Students taking the prepharmacy year in colleges other than in the School of Science, Education, and Humanities, Purdue University, should submit 32 or more semester hours of credit, including the following:

General inorganic chemistry and qualitative analysis.....	8 hours
Mathematics (algebra and trigonometry).....	6 hours
English composition	3 hours
Speech or rhetoric	3 hours
Approved electives	12 to 16 hours
Total	32 to 36 hours

Approved electives include:

Modern language	6 hours
Botany	4 hours
Zoology	4 hours
Principles of economics	3 or 6 hours
Introductory sociology	3 hours
Elementary psychology	3 hours
Drafting	2 or 4 hours
American government	3 or 6 hours
Mathematics (analytic geometry and calculus)	6 hours
English literature or composition	3 hours
Developmental Reading	1 hour
Physical education	1 or 2 hours

If an applicant has the required number of hours of academic credit but does not have credit for all prescribed subjects, he may be admitted with eight semester hours of deficiency, which must be made up before graduation.

The attention of applicants is directed to the following admission and residence provisions:

1. Students who have completed the prepharmacy year at Purdue or elsewhere cannot be assured of admission to the School of Pharmacy. When the number of qualified applicants exceeds the available facilities, preference will be given to residents of Indiana, and selection of students will be made on the basis of qualifications as determined from the transcript of record, examinations, and personal interviews.

2. Students will enter the professional program of study in the School of Pharmacy only at the beginning of the fall semester of each academic year. Application for admission should be made on or before April 1 preceding the planned entrance date.

3. Three years' residence in an accredited school or college of pharmacy is required for qualification for the degree of Bachelor of Science in Pharmacy.

SCHOOL OF SCIENCE, EDUCATION, AND HUMANITIES

Dean Ayres in charge

BIOLOGICAL SCIENCES

Professor Koffler in charge

General Biology

101. **GENERAL BIOLOGY.** Class 2, Lab. 2, cr. 3.

Fundamental facts underlying the biological sciences; study of a series of type forms, with emphasis on laboratory exercises.

102. **GENERAL BIOLOGY.** Class 2, Lab. 2, cr. 3.

Continuation of BIO 101.

107. **HUMAN BIOLOGY.** Class 3, cr. 3.

The human structure and physiology. Not for premedical students and majors in biological sciences. Satisfies the biology requirement for the B.S. degree of the School of Science, Education, and Humanities.

110. **APPLIED INDUSTRIAL MICROBIOLOGY.** Class 2, cr. 2, or Class 2, Lab. 2, cr. 3. (Offered only by the Division of University Centers.)

Applications of microorganisms to industry and their relations to infection and immunity, public health, microbiological assay of foods, and preparation of antibiotics.

Bacteriology

210. **GENERAL MICROBIOLOGY.** Class 2, Lab. 3, cr. 3.

Microorganisms: their isolation, cultivation, identification, and importance to man.

211. **BACTERIOLOGY.** Class 2, Lab. 4, cr. 4. Must be preceded by CHM 112 and BIO 101, or PLSC 140 or 142 or PHAR 362, except for juniors in civil engineering.

General bacteriology: methods of detection, isolation, and identification.

213. **GENERAL MICROBIOLOGY.** Class 2, Lab 2, cr. 2 $\frac{2}{3}$. (Offered only in the nurses training program by the Division of University Centers.)

Microorganisms: their isolation and cultivation, identification, and importance to man.

511. **MEDICAL MICROBIOLOGY.** Class 2, Lab. 4, cr. 4. Must be preceded by BACT 212 and CHM 252.

Study of the microorganisms associated with infectious diseases and consideration of the principles of immunology and serology.

Plant Sciences

140. **INTRODUCTION TO PLANT LIFE.** Class 3, Lab. 3, cr. 4.

Fundamental principles of the structure, function, and relationships of plants.

Zoology

160. **BIOLOGY OF ANIMALS.** Class 3, Lab. 3, cr. 4.

Basic biological principles of animals.

161. **GENERAL ZOOLOGY.** Class 2, Lab. 4, cr. 4.

Basic course in zoology for premedical students, those majoring in zoology, and others expecting to take ZOOL 162.

162. **COMPARATIVE ANATOMY OF VERTEBRATES.** Class 2, Lab. 6, cr. 4. Must be preceded by ZOOL 161 or equivalent.

Comparison of the structure of vertebrate animals; dissection of examples of the principal types.

260. **ANATOMY.** Class 2, Lab. 3, cr. 3. Must be preceded by BIO 101 and 102 or equivalent.

Lectures on anatomy as applied to the human body, with special emphasis on bones and muscles. Dissection of the cat and study of prepared skeletons.

263. **ANATOMY AND PHYSIOLOGY.** Class 2, Lab. 2, cr. 2 $\frac{2}{3}$. (Offered only in the nurses training program by the Division of University Centers.)

Lectures, recitations, and laboratory work in basic anatomy and human physiology.

264. **ANATOMY AND PHYSIOLOGY.** Class 2, Lab. 2, cr. 2 $\frac{2}{3}$. (Offered only in the nurses training program by the Division of University Centers.)

Continuation of ZOOL 263.

34 • DESCRIPTION OF COURSES

360. **PHYSIOLOGY:** Brief Course. Class 3, cr. 3. Must be preceded by BIO 101 and 102 or equivalent.

Lectures, demonstrations, and textbook work on the fundamental principles of the anatomy, physiology, and hygiene of the human body.

370. **PHYSIOLOGY.** Class 3, cr. 3. Must be preceded by BIO 101 and 102 or ZOOL 160.

Physiology of tissues in general, muscle, nerve, brain, and sense organs.

371. **PHYSIOLOGY.** Class 3, cr. 3. Must be preceded by BIO 101 and 102 or ZOOL 160.

Physiology of circulation, respiration, digestion, excretion, and endocrine glands.

CHEMISTRY

Professor McBee in charge

Students expecting to major in chemistry or physics, and all engineering students, will take CHM 115 and 116, provided their preparation is adequate. Those with superior preparation may take CHM 117, followed by 118 or 126. Students with inadequate preparation will take CHM 100, 103, and 116.

100. **ELEMENTARY CHEMISTRY.** Class 3, cr. 3. Does not carry credit toward graduation in the schools of Engineering and Science, Education, and Humanities. Does not serve as a prerequisite to CHM 108, 110, 112, or 114.

An introductory chemistry course.

103. **ELEMENTARY CHEMISTRY.** Class 3, Lab. 3, cr. 4.

A continuation of CHM 100. CHM 100 and 103 cover the content of CHM 115; these courses should be followed by CHM 116.

109. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

Required of all freshmen in the pre-pharmacy option of the School of Science, Education, and Humanities.

110. **GENERAL CHEMISTRY WITH QUALITATIVE ANALYSIS.** Class 2, Lab. 6, cr. 4.

Continuation of CHM 109, with laboratory work in qualitative analysis.

111. **GENERAL CHEMISTRY.** Class 2, Lab. 3, cr. 3.

Required of all freshmen registered in the School of Agriculture, or in biology options of the School of Science, Education, and Humanities who are not in CHM 115 or 117.

112. **GENERAL CHEMISTRY.** Class 2, Lab. 3, cr. 3.

Continuation of CHM 111.

115. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

Required for students majoring in chemistry and physics, and all engineering students. Students with superior preparation will take CHM 117, and students with inadequate preparation will substitute CHM 100 and 103 for CHM 115. Certain students whose work is unsatisfactory in CHM 115 may be given credit, with an appropriate grade, for CHM 100 and assigned to CHM 103 the following semester.

Laws and principles of chemistry, with special emphasis on topics of importance in engineering. Numerical problems and relationships are introduced whenever quantitative treatment is possible.

116. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

A continuation of CHM 115.

119. **GENERAL CHEMISTRY.** Class 2, Lab. 2, cr. 2 $\frac{2}{3}$. (Offered only in the nurses training program by the Division of University Centers.)

226. **QUALITATIVE ANALYSIS.** Class 2, Lab. 6, cr. 4. Must be preceded by CHM 116 or 118.

Semimicro qualitative analysis for cations and anions.

227. **INTRODUCTORY QUANTITATIVE ANALYSIS.** Class 2, Lab. 6, cr. 4. Must be preceded by CHM 126 or 226.

Introduction to quantitative methods.

551. **ORGANIC CHEMISTRY.** Class 3, Lab. 5, cr. 4. Must be preceded by CHM 126, 223, or 226.

An elementary course covering aliphatic and alicyclic compounds, including about 20 laboratory experiments.

552. **ORGANIC CHEMISTRY.** Class 3, Lab. 5, cr. 4.

Continuation of CHM 551 covering aromatic compounds and special subjects.

EDUCATION

Professor Cooper in charge

260. **PRINCIPLES AND OBJECTIVES OF TRADE AND INDUSTRIAL EDUCATION.** Class 3, cr. 3.

Historical and legislative background for the development of trade and industrial education, objectives for operating the various types of schools and programs.

285. **EDUCATIONAL PSYCHOLOGY.** Class 3, cr. 3. Must be preceded by PSY 120.

An introduction to the application of psychology to education, with particular emphasis on human development and learning.

460. ***SPECIAL METHODS OF TEACHING TRADE AND INDUSTRIAL SUBJECTS.** Class 3, cr. 3. Must be preceded by PSY 120, 230, and ED 285, 300, and 304.

Principles and procedures for teaching trade and industrial subjects.

467. **SCHOOL SHOP MANAGEMENT.** Class 3, cr. 3.

The school shop and drawing room, including equipment and management. Layout selection and arrangement of equipment and supplies; methods of organization and management.

468. **OCCUPATIONAL AND TRADE ANALYSIS.** Class 3, cr. 3.

Methods of analysis of trade and occupation to determine essential content for courses of study.

469. **ORGANIZATION OF INSTRUCTION MATERIAL FOR TRADES AND INDUSTRIES.** Class 3, cr. 3. Must be preceded by PSY 120 and 230, and ED 285, 300, 304, and 468.

Application of governing principles to establish an effective arrangement for teaching content required for occupational courses in vocational schools and classes.

474. **CONFERENCE LEADERSHIP TRAINING.** cr. 2 or 3.

Training by the conference method, making use of devices, techniques, and material necessary to the work of the conference leader.

500. **AUDIO-VISUAL AIDS FOR TEACHERS.** cr. 2 or 3. Must be preceded by 12 hours of education and psychology.

Sources, selection, and effective use of audio-visual aids and preparation of audio-visual materials.

504. **INTRODUCTION TO MEASUREMENT AND EVALUATION.** Class 2, Lab. 2, cr. 3.

Introductory course in the theory and practice of measurement, with illustrations from education, industry, and business; emphasis on the guidance functions of the measuring devices studied.

510. **PRINCIPLES AND PROBLEMS OF VOCATIONAL AND EDUCATIONAL GUIDANCE.** Class 3, cr. 3. Must be preceded by

12 hours of psychology and education or equivalent professional training.

The development of vocational and educational guidance in the home, school, industry, and service organizations; consideration of the principles and present practices in such guidance.

514. **THE USE OF COMMUNITY RESOURCES IN GUIDANCE.** Class 3, cr. 3.

Analysis and utilization of available community resources that have a bearing upon the development and activities of young people.

526. **REMEDIAL READING.** cr. 2 to 4. Must be preceded by 12 hours in education and psychology.

Techniques in remedial reading for children, adolescents, and adults.

530. **ADVANCED EDUCATIONAL PSYCHOLOGY.** Class 3, cr. 3. Must be preceded by PSY 120 and ED 285.

Principles of learning evaluated in relation to current methods of instruction and to the results from research in education and psychology.

560. **CURRICULUM DEVELOPMENT IN INDUSTRIAL EDUCATION.** cr. 2 or 3.

Senior standing or by consent of the instructor.

Current curriculum problems and trends in industrial education.

564. **TESTS AND MEASUREMENTS IN INDUSTRIAL EDUCATION.** Class 3, cr. 3. Must be preceded by PSY 500 or equivalent.

Designed for industrial education students as an alternative course for ED 504. Concepts involved in testing and measuring, with applications in industry and industrial education.

568. **INSTRUCTION MATERIALS FOR TRADES AND INDUSTRIES.** cr. 1 to 6. Must be preceded by PSY 120 and ED 285, 300, 304, 460, and 468, or by permission of the instructor. (Not more than three hours may be accepted toward an advanced degree.)

Application of governing principles to establish an effective arrangement of teaching content required for occupational courses in vocational schools and classes.

*The minimum requirements in this course are prescribed by the State Board of Education for regular high school licenses and for vocational licenses. Six hours of directed observation and 12 hours of directed teaching are required for each semester hour of credit.

36 • DESCRIPTION OF COURSES

572. **PART-TIME AND EVENING-SCHOOL PROGRAMS IN INDUSTRIAL EDUCATION.** cr. 1 to 3. Senior standing or by special consent of instructor.

Problems faced by coordinators, supervisors, and administrators in operating part-time and evening schools, with special emphasis on public relations, teacher selection, in-service training, buildings, and equipment.

574. **PRINCIPLES AND PRACTICE OF TRAINING IN INDUSTRY.** Class 3, cr. 3. Senior standing or by special consent of the instructor.

Analysis of training needs; organization of training programs; typical training departments; basic principles of development; relationship of training department to other departments of the industrial plant.

590. **INDIVIDUAL RESEARCH PROBLEMS.** cr. 1 to 6. Must be preceded by six hours of psychology and six hours of education or equivalent professional training and approval by the department.

Opportunities for students to study particular problems under the guidance of a member of the staff. This plan of individualized instruction may be used in any field of education or vocational education. Does not include thesis work.

600. **HISTORY AND PHILOSOPHY OF EDUCATION.** Class 3, cr. 3.

608. **SEMINAR IN GENERAL EDUCATION.** cr. 2 to 4.

612. **ORGANIZATION AND ADMINISTRATION OF GUIDANCE.** Class 3, cr. 3.

620. **SECONDARY SCHOOL CURRICULUM.** cr. 2 to 3.

637. **ORGANIZATION AND ADMINISTRATION OF VOCATIONAL EDUCATION.** cr. 1 to 4.

639. **CLINIC FOR EDUCATIONAL LEADERS.** cr. 1 to 6.

658. **SEMINAR IN HOME ECONOMICS EDUCATION.** cr. 2 to 6.

668. **SEMINAR IN VOCATIONAL TRADE AND INDUSTRIAL EDUCATION.** cr. 2 to 4.

696. **RESEARCH IN TRADES AND INDUSTRIES.** cr. 1 to 6.

ENGLISH

Professor Mills in charge

101. **ENGLISH COMPOSITION I.** Class 3, cr. 3. Prerequisite to all courses in English except ENGL 2, 3, 103, and 185.

Purpose: to develop competence in written expression through directed practice in writing. Emphasis on problems of mechanics and organization.

103. **ENGLISH COMPOSITION.** Class 3, cr. 3.

A composition course for freshmen provisionally excused from ENGL 101 on the basis of orientation tests. The course attempts to develop writing on a high critical level, improve reading tastes, and arouse an interest in the humanities and conflicting intellectual attitudes. Credit in the course may not be established by examination.

Students who receive grade C or better will be excused from ENGL 202 and given credit for ENGL 101; those who receive grade D must take ENGL 101 or 202, depending upon recommendation of the ENGL 103 instructor; those who fail to pass ENGL 103 must take both ENGL 101 and 202.

185. **DEVELOPMENTAL READING.** Lab. 2, cr. 1.

Purpose: to increase reading efficiency by improving comprehension and by developing the motor skills involved in reading speed. Motivates reading interest through use of films and pacers.

202. **ENGLISH COMPOSITION II.** Class 3, cr. 3. The second half of the basic composition course. Emphasis on problems of diction and logical analysis.

A student who has received a grade of A in ENGL 101 may, with the approval of the head of his school, substitute for ENGL 202 an elective course in English.

230. **INTRODUCTION TO LITERATURE.** Class 3, cr. 3. Not open to students with credit for ENGL 238.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on types of narrative literature.

With ENGL 231 it satisfies literature requirement of School of Science, Education, and Humanities.

231. INTRODUCTION TO LITERATURE.
Class 3, cr. 3.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on various types of literature.

235. INTRODUCTION TO THE DRAMA. Class 3, cr. 3.

Drama as literature and as theatre art. Forms, techniques, and subject matter of the drama as illustrated by about 25 plays, most of them modern.

238. INTRODUCTION TO FICTION. Class 3, cr. 3. Not open to students with credit for ENGL 230.

Reading and discussion of selected short stories and seven novels, to promote awareness, understanding, and appreciation of the range, values, techniques, and meanings of reputable modern fiction.

240. INTRODUCTION TO THE LITERATURE OF ENGLAND: CHAUCER TO POPE. Class 3, cr. 3.

Offering fairly extensive acquaintance with a few major writers, this course aims at both competence in literary analysis and awareness of the relation between each writer and his times.

Required of all students majoring in literature.

250. GREAT AMERICAN BOOKS. Class 3, cr. 3.

Seven books, such as *The Scarlet Letter*, *Moby Dick*, and *Walden*, read and discussed as to their literary qualities and their cultural significance.

310. NEWSWRITING. Class 3, cr. 3.

News stories of different types are written. Acquaintance is made with some of the more notable current American newspapers.

Required of all students majoring in journalism.

405. CREATIVE WRITING. Class 3, cr. 3.

Informally conducted for students who enjoy writing—of any kind except the narrowly technical—and concerned with problems of form, style, diction, sentence structure. Workshop criticism. May be repeated for credit.

420. BUSINESS WRITING: GENERAL APPLICATIONS. Class 3, cr. 3.

Application of business writing principles to the preparation of common letter types, reports, and advertising copy. Sales adjustment, collection, and employment letters are stressed.

555. MAIN CURRENTS OF AMERICAN THOUGHT. Class 3, cr. 3.

A survey of dominant ideas and intellectual trends in America from 1607 to the present as revealed through American literature and as related to American life and culture.

576. MODERN DRAMA: THE PLAYS OF IBSEN AND BERNARD SHAW. Class 3, cr. 3.

A course dealing with the two greatest dramatists of the past century. Plays of Ibsen and Shaw are examined thoroughly for both ideas and technique.

577. MODERN ENGLISH AND AMERICAN POETRY. Class 3, cr. 3.

Surveys modern poetry from Hardy to Auden; relates it to the main currents of contemporary thought and feeling; introduces elementary critical principles.

HISTORY, GOVERNMENT, AND PHILOSOPHY

Professor Ogle in charge

History

200. EARLY CIVILIZATION. Class 3, cr. 3.

A survey of European development from earliest times through the sixteenth century, this course is designed to meet the needs of the beginning student in European and world history.

201. DEVELOPMENT OF MODERN CIVILIZATION. Class 3, cr. 3.

A continuation of HIST 200, this course traces the expansion of Europe into the Americas, Africa, and Asia. The French Revolution, nationalism, and the development of Western European states from the sixteenth century to the present are studied.

204. AMERICAN HISTORY TO 1865. Class 3, cr. 3.

A study of the development of American political, economic, and social institutions from the early explorations and colonial settlements to the conclusion of the Civil War.

38 • DESCRIPTION OF COURSES

205. THE UNITED STATES AND ITS PLACE IN WORLD AFFAIRS. Class 3, cr. 3.

A study of the growth of the United States from the period of the Reconstruction to the present. The new industrialism, agrarian problems, territorial expansion, the two world wars, depression, the New Deal, and similar topics are analyzed.

210. HISTORY OF EUROPE SINCE 1914. Class 3, cr. 3.

A survey of the causes, campaigns, and diplomacy of World War I; post war adjustments and the inter-war period; the causes, campaigns, and diplomacy of World War II and a survey of each of the major countries since 1945.

405. EUROPE IN THE SIXTEENTH, SEVENTEENTH, AND EIGHTEENTH CENTURIES. Class 3, cr. 3.

This course treats the emergence of the institutions and concepts of modern Europe during the period from the fifteenth to the nineteenth century. Particular attention is given to the Renaissance, the Reformation, economic and social change, and political concepts culminating in the French Revolution and Napoleon.

410. EUROPEAN HISTORY, 1815-1914. Class 3, cr. 3.

The major topics of study examined in this course are the developments in European nationalism culminating in the unification of Germany and Italy, political liberalism particularly as achieved by the Third French Republic, socialism both utopian and scientific which emerged in the revolutions of 1848, and the growth and expansion of Europe under the industrial revolution.

Government

101. INTRODUCTION TO GOVERNMENT. Class 3, cr. 3.

The problems of government as illustrated by American national government. Attention to political theory as well as to the organization and problems of government.

102. INTRODUCTION TO GOVERNMENT. Class 3, cr. 3. Must be preceded by GVMT 101.

State and local government: powers, relationships, and problems of administration, with emphasis on the Middle Western states.

301. ELEMENTS OF DEMOCRACY. Class 3, cr. 3. Not open to students who have had GVMT 101.

Fundamental problems all governments must face, and how they are met in a democracy as contrasted with other types of society.

331. INTERNATIONAL RELATIONS. Class 3, cr. 3.

Introductory survey of the underlying forces in international relations, the foreign policies of the great powers, and agencies of control and cooperation.

532. CONTEMPORARY INTERNATIONAL PROBLEMS. Class 3, cr. 3.

Current international issues and developments in international cooperation and world order.

Philosophy

310. INTRODUCTION TO PHILOSOPHY. Class 3, cr. 3.

The basic problems and types of philosophy, with special emphasis upon the problem of knowledge and nature of reality.

May be applied toward meeting the philosophy requirement of the School of Science, Education, and Humanities.

MATHEMATICS

Professor Fuller in charge

Students expecting to major in mathematics, physics, or chemistry, and all engineering students, will take MA 161, 162, 261, and 262. If their preparation is inadequate for this series of courses, they will take MA 151, 152, 162, 261, and 262.

1. HIGH SCHOOL ALGEBRA. Class 5, cr. 0. Credit, one unit for admission.

2. PLANE GEOMETRY. Class 5, cr. 0. Credit, one unit for admission.

4. ADVANCED HIGH SCHOOL ALGEBRA. Class 2, cr. 0. Credit, one-half unit for admission.

For engineering students with an entrance deficiency in this subject.

111. ALGEBRA. Class 3, cr. 3.

112. TRIGONOMETRY. Class 3, cr. 3. Should be preceded by MA 111.

115. ALGEBRA. Class 4, cr. 4. (Offered only by the Division of University Centers.)

116. ANALYTIC GEOMETRY. Class 4, cr. 4. (Offered only by the Division of University Centers.)

Plane and solid analytic geometry.

121. GENERAL COLLEGE MATHEMATICS I.
Class 3, cr. 3.

With MA 122 satisfies the core requirements for mathematics for the B.S. degree in the School of Science, Education, and Humanities.

122. GENERAL COLLEGE MATHEMATICS II.
Class 3, cr. 3. Continuation of MA 121.

151. ELEMENTARY MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES I. Class 5, cr. 5, or Class 4, Lab. 2, cr. 5. For students with inadequate preparation for MA 161.

MA 151 and 152 cover in two semesters the material of MA 161 with more drill work and review of algebraic background.

Does not carry credit toward graduation in the Schools of Engineering.

152. ELEMENTARY MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES II. Class 5, cr. 5. Continuation of MA 151.

161. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES I. Class 5, cr. 5, or Class 4, Lab. 2, cr. 5.

Required for students majoring in mathematics, physics, and chemistry, and all engineering students. Students with inadequate preparation will substitute MA 151 and 152 for MA 161. Certain students whose work is unsatisfactory in MA 161 may be given credit, with appropriate grade, for MA 151, and assigned to MA 152 the following semester.

Introductory course preparing for calculus.

162. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES II. Class 5, cr. 5. Must be preceded by MA 152 or 161.

Analytical geometry and calculus.

241. CALCULUS I. Class 4, cr. 4. Must be preceded by MA 116. (Offered only by the Division of University Centers.)

242. CALCULUS II. Class 4, cr. 4. Must be preceded by MA 241. (Offered only by the Division of University Centers.)

261. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES III. Class 4, cr. 4. Must be preceded by MA 162.

Analytic geometry and calculus.

262. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES IV. Class 4, cr. 4. Must be preceded by MA 261.

Topics in calculus and differential equations.

421. DIFFERENTIAL EQUATIONS AND APPLICATIONS. Class 3, cr. 3. Not open to students with credit in MA 422. Must be preceded by differential and integral calculus.

Derivations and solutions of differential equations for problems in applied fields.

422. DIFFERENTIAL EQUATIONS FOR ENGINEERING AND THE PHYSICAL SCIENCES. Class 3, cr. 3. Not open to students with credit in MA 421. Must be preceded by MA 262.

Derivation and solutions of additional types of differential equations for problems in science and engineering.

500. ABSTRACT ALGEBRA I. Class 3, cr. 3. Must be preceded by MA 262.

Elementary properties of groups, rings, and fields.

501. ABSTRACT ALGEBRA II. Class 3, cr. 3. Must be preceded by MA 500.

Additional topics in fields and groups, linear transformations and matrices, and algebras.

520. PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS. Class 3, cr. 3. Must be preceded by MA 421. (Students cannot use both MA 520 and 521 in any graduate program.)

Solution of boundary value problems using Fourier series, Bessel functions, Legendre polynomials; heat equation, wave equation, Laplace's equation.

521. ADVANCED ENGINEERING MATHEMATICS I. Class 3, cr. 3. Must be preceded by MA 421. (Students cannot use both MA 520 and 521 in any graduate program.)

Power series, Fourier series; hyperbolic, gamma, and Bessel functions; linear partial differential equations. Emphasis on applications.

522. ADVANCED ENGINEERING MATHEMATICS II. Class 3, cr. 3. Must be preceded by MA 421.

(Students may not use both MA 522 and 525 in any graduate program.)

Laplace transforms, functions of a complex variable, line and surface integrals, vector analysis.

523. VECTOR ANALYSIS. Class 3, cr. 3. Must be preceded by MA 262.

Vector algebra, vector calculus; integral theorems of Gauss, Green, and Stokes; applications.

40 • DESCRIPTION OF COURSES

525. APPLIED THEORY OF COMPLEX FUNCTIONS. Class 3, cr. 3. Must be preceded by MA 521, 541, or 544.

(Students may not use both MA 522 and 525 in any graduate program.)

Primarily for students in applied science.

Fundamental operations on complex numbers and functions, power series, contour integration, conformal mapping. Applications to two-dimensional flow and potential theory.

541. ADVANCED CALCULUS I. Class 3, cr. 3. Must be preceded by MA 242 or 262.

Critical review of fundamental notions of calculus; differential calculus of functions of several variables; implicit function theorems.

542. ADVANCED CALCULUS II. Class 3, cr. 3. Must be preceded by MA 541 or 531.

Vectors and vector fields; integral calculus of functions of several variables; line and surface integrals; Green's and Stokes' theorems; infinite series; uniform convergence.

MODERN LANGUAGES

Professor Hocking in charge

French

101. FIRST COURSE IN FRENCH. Class 2, Lab. 2, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for FR 101 without satisfactorily completing a more advanced course in French.

102. SECOND COURSE IN FRENCH. Class 2, Lab. 2, cr. 3. Must be preceded by FR 101 or equivalent.

Continuation of FR 101.

German

101. FIRST COURSE IN GERMAN. Class 2, Lab. 2, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for GER 101 without satisfactorily completing a more advanced course in German.

102. SECOND COURSE IN GERMAN. Class 2, Lab. 2, cr. 3. Must be preceded by GER 101 or equivalent.

Continuation of GER 101.

203. THIRD COURSE IN GERMAN. Class 3, cr. 3. Must be preceded by GER 102 or equivalent.

Readings from the works of nineteenth century and contemporary German writers; practice in speaking and writing German.

244. FOURTH COURSE IN SCIENTIFIC GERMAN. Class 3, cr. 3. Must be preceded by GER 203 or equivalent. Credit will not be given for both GER 204 and 244.

Russian

101. FIRST COURSE IN STANDARD RUSSIAN. Class 2, Lab. 2, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for RUSS 101 without satisfactorily completing a more advanced course in Russian.

102. SECOND COURSE IN STANDARD RUSSIAN. Class 2, Lab. 2, cr. 3. Must be preceded by RUSS 101 or equivalent.

Continuation of RUSS 101.

Spanish

101. FIRST COURSE IN SPANISH. Class 2, Lab. 2, cr. 3.

For students who have had no previous work in Spanish. Those who have had previous work and whose placement tests do not qualify them for a higher course will be assigned to the review course SPAN 111.

102. SECOND COURSE IN SPANISH. Class 2, Lab. 2, cr. 3, \$36. Must be preceded by SPAN 101 or equivalent.

PHYSICAL EDUCATION FOR MEN

Professor Mackey in charge

100. PERSONAL LIVING. Class 1, cr. $\frac{2}{3}$.

Required of all male freshmen except those enrolled in Military Band 111 or Naval ROTC, veterans of military forces, and engineering freshmen.

101. PHYSICAL EDUCATION ORIENTATION. Class 1, cr. 1.

102. **HISTORY OF PHYSICAL EDUCATION.** Class 1, cr. 1.

103. **PHYSICAL EDUCATION CURRICULAR ACTIVITIES.** Class 1, Lab. 4, cr. 3.
Theory and skill techniques in gymnastics, soccer, tennis, handball, and squash.

104. **PHYSICAL EDUCATION CURRICULAR ACTIVITIES.** Class 1, Lab. 4, cr. 3.
Theory and skill techniques in apparatus, tumbling, golf, volleyball, and badminton.

112. **PHYSICAL ACTIVITIES.** Lab. 3, cr. 1.

151. **SPORTS OFFICIATING.** Class 1, Lab. 3, cr. 2.
Principles of officiating.

161. **SQUARE DANCING AND SOCIAL GAMES.** Lab. 3, cr. 1.

203. **PRINCIPLES OF INTRAMURAL ATHLETIC ACTIVITIES.** Class 3, cr. 3.

204. **PHYSICAL EDUCATION RHYTHMIC ACTIVITIES.** Class 1, Lab. 2, cr. 2.
Theory and skill techniques in group games, dancing, and other social activities.

205. **PHYSICAL EDUCATION CURRICULAR ACTIVITIES.** Class 1, Lab. 4, cr. 3.

206. **PHYSICAL EDUCATION CURRICULAR ACTIVITIES.** Class 1, Lab. 4, cr. 3.

380. **FIRST AID AND SAFETY.** Class 1, Lab. 2, cr. 2. For three credits see PEW 380 in the *School of Science, Education, and Humanities Bulletin*.

RECREATION

502. **ORGANIZATION OF CHORAL AND ORCHESTRAL MUSIC.** Class 3, cr. 3.

The organization, direction, and maintenance of choral and instrumental recreation, with special emphasis on nontechnical approach which will make music attractive to industrial employees and an employee activity.

PHYSICAL EDUCATION FOR WOMEN

Professor Hazelton in charge

100. **PHYSICAL EDUCATION.** Lab 2, cr. 1.

A wide range of activities at varying levels of ability designed to develop recreational skills and interests and to contribute to the maintenance of physical well-being. Required of freshman and sophomore women for four semesters.

PHYSICS

Professor James in charge

100. **OUTLINE OF PHYSICS FOR NURSES.** Class 4, Lab. 3, cr. 5. Offered at the Indianapolis Center.

General physics, with emphasis on applications to medicine.

152. **MECHANICS.** Class 3, Lect. Dem. 1, Lab. 2, cr. 4. Must be preceded or accompanied by MA 162.

Statics; uniform and accelerated motion; Newton's laws; circular motion; energy, momentum, and conservation principles; dynamics of rotation; gravitation and planetary motion; elasticity; simple harmonic and wave motion; hydrostatics; hydrodynamics; intermolecular forces.

201. **GENERAL PHYSICS.** Class 2, Lab. 3, cr. 3. (Offered only by the Division of University Centers.) Must be preceded by or taken concurrently with MA 111, 112, or equivalent. General physics, with emphasis on fields allied to medicine.

202. **GENERAL PHYSICS.** Class 2, Lab. 3, cr. 3. (Offered only by the Division of University Centers.)
Continuation of PHYS 201.

220. **GENERAL PHYSICS.** Class 3, Lab. 3, cr. 4. Must be preceded by MA 111 and 112, or 121 and 122, or 101.

Mechanics, heat, and sound for students not specializing in physics.

221. **GENERAL PHYSICS.** Class 3, Lab. 3, cr. 4. Must be preceded by PHYS 220.

Electricity, light, and modern physics for students not specializing in physics.

251. **HEAT, SOUND, AND ELECTRICITY.** Class 5, Lab. 2, cr. 5. Must be preceded by PHYS 152.

Heat, kinetic theory, elementary thermodynamics, heat transfer. Sound. Electrostatics, current electricity, electrochemistry, electromagnetism, magnetic properties of matter, transient and alternating currents; thermionics.

262. **OPTICS AND MODERN PHYSICS.** Class 5, Lab. 2, cr. 5. Must be preceded by PHYS 251 or 261.

Radiations, the electromagnetic spectrum, geometrical and physical topics. Modern physics, relativity; quantum concepts, atomic and molecular spectra and structures; physics of the solid state; nuclear physics.

42 • DESCRIPTION OF COURSES

520. ACOUSTICS. Class 3, cr. 3. Must be preceded by MA 261 and by two terms of general physics.

Introduction to the acoustics of reproduction and communication systems; architectural acoustics, sound production and reception.

530. ELECTRICITY AND MAGNETISM. Class 3, cr. 3. Must be preceded by PHYS 330 or EE 315, 316, or equivalent.

An introductory theoretical course. Vector analysis; electrostatic problems; theory of dielectrics; theory of conduction; thermoelectric and photoelectric phenomena; electromagnetic effects due to steady and changing currents; magnetic properties of matter; Maxwell's equations; radiation.

550. INTRODUCTION TO MODERN PHYSICS.

Class 3, cr. 3. Should be preceded by at least one junior-level course in both mathematics and physics, or the equivalent.

Survey of the principles of modern physics and their application primarily to atomic and molecular systems, special relativity, quantum mechanics, kinetic theory, and quantum statistics; X-rays; and atomic and molecular spectra and structure.

556. INTRODUCTION TO NUCLEAR PHYSICS. Class 3, cr. 3. Must be preceded by PHYS 550, or taken by special arrangement.

Theory of relativity, elementary particles, structure of stable nuclei, radioactivity, interaction of nuclear radiation with matter, nuclear reactions, particle accelerators, nuclear instruments, fission, nuclear reactors, cosmic radiation and high energy physics, mesons, hyperons.

PSYCHOLOGY

Professor Asher in charge

120. ELEMENTARY PSYCHOLOGY. Class 3, cr. 3.

Introduction to the fundamental principles of psychology, covering particularly the topics of personality, intelligence, emotion, attention, perception, learning, memory, and thinking.

235. CHILD PSYCHOLOGY. Class 3, cr. 3. Must be preceded by PSY 120 or its equivalent.

Age-level characteristics and needs of children from birth to the teens in motor control, language, learning, play, etc.; interpersonal relations and other factors affecting children.

340. GENERAL SOCIAL PSYCHOLOGY.

Class 3, cr. 3. Must be preceded by six hours of psychology or three hours of psychology and three hours of sociology. GS 234 may be included as three hours of sociology. (Same as SOC 340.)

Conditions and consequences of human behavior in social situations, with emphasis upon the mechanism and the process on the bases of which socialization takes place.

350. ABNORMAL PSYCHOLOGY. Class 3, cr. 3. Must be preceded by six hours of psychology.

Various forms of mental disorders from the standpoint of their origin, treatment, prevention, social significance, and relation to problems of normal human adjustment.

500. STATISTICAL METHODS APPLIED TO PSYCHOLOGY, EDUCATION, AND SOCIOLOGY. Class 2, Lab. 2, cr. 3. Must be preceded by six hours of education and/or psychology and/or sociology.

Application of elementary statistical concepts, such as central tendency, variability correlation, validity, and reliability, to problems of psychology and mental measurements.

532. PSYCHOLOGY OF THE EXCEPTIONAL CHILD. Class 3, cr. 3. Must be preceded by six semester hours of psychology.

Principles of diagnostic testing, adaptive teaching, and guidance applied to the improvement of teaching and to the correction of learning difficulties of exceptional children.

533. PROBLEMS IN CHILD PSYCHOLOGY. Class 3, cr. 3. Must be preceded by six semester hours of psychology.

Development of the child from birth to adolescence, with special study of such topics as play, sex differences, and learning at different age levels.

534. PSYCHOLOGY OF ADOLESCENCE. Class 3, cr. 3. Must be preceded by six semester hours of psychology.

Development during the teens, with special reference to general life problems facing youth of these ages, and an investigation into ways and means of helping youth to meet its problems constructively.

537. MENTAL HYGIENE IN EDUCATION. Class 3, cr. 3. Must be preceded by PSY 120 and ED 285.

General principles of mental and emotional health and how to set up constructive conditions for the years of childhood and youth; the child in relation to parents, teachers, and children.

550. INTRODUCTION TO CLINICAL PSYCHOLOGY. Class 3, cr. 3. Must be preceded by 12 hours of psychology.

The case-study method, including a discussion of the importance of historical information, the contribution of clinical tests to diagnosis, and a general survey of prevention and treatment techniques.

570. INDUSTRIAL PSYCHOLOGY. Class 3, cr. 3.

Introduction to psychology through the topics of individual differences, aptitude testing, merit ratings, industrial safety motivation, morale, and training.

574. PSYCHOLOGY OF INDUSTRIAL TRAINING. Class 3, cr. 3. Must be preceded by PSY 570.

The training of industrial personnel. Consideration of effective methods for training inspectors, apprentices, and supervisors.

576. PSYCHOLOGY OF WORK EFFICIENCY.

Class 3, cr. 3. Must be preceded by PSY 570.

Factors affecting industrial work efficiency, such as fatigue and monotony, hours of work, rest pauses, working conditions, and biomechanics, with particular emphasis on psychological aspects.

578. PSYCHOLOGICAL APPROACHES TO JOB ANALYSIS. Class 3, cr. 3. Must be preceded by PSY 570.

Techniques of systematic job study primarily for purposes of establishing personnel specifications and deriving training content; emphasis on analysis procedures and the preparation of job descriptions.

SOCIOLOGY

Professor Christensen in charge

100. INTRODUCTORY SOCIOLOGY. Class 3, cr. 3.

A survey course designed to introduce the student to the science of human society. Fundamental concepts, description, and analysis of society, culture, the socialization process, social institutions, and social change. A first course for sociology majors and a possible terminal course for nonmajors.

220. SOCIAL PROBLEMS. Class 3, cr. 3.

Must be preceded by SOC 100 or GS 234 or equivalent.

Analysis of problem conditions in modern society—family disorganization, racial conflicts, class struggle, mental illness, narcotic addiction, gambling, alcoholism, and others. Social factors involved in the development, continued existence, and amelioration of these conditions.

330. RURAL SOCIOLOGY. Class 3, cr. 3.

The structure and functions of rural society; rural people, groups, institutions, and organizations; current problems in rural society.

350. MARRIAGE AND FAMILY RELATIONSHIPS. Class 3, cr. 3.

Designed to provide further understanding of family relationships for those unmarried, those contemplating marriage, those married, and prospective counselors of all of them. A functional approach to the interpersonal relationships of courtship, marriage, and family life. Open to both men and women.

521. JUVENILE DELINQUENCY. Class 3, cr. 3. Must be preceded by SOC 100 or GS 234 or equivalent.

A study of social and psychological factors influencing individual delinquent behavior patterns. Emphasis on preventive and rehabilitative programs and the role of community agencies, such as social service agencies, juvenile courts, youth authorities. Visits to selected organizations and institutions.

522. CRIMINOLOGY AND PENOLOGY. Class 3, cr. 3. Must be preceded by SOC 100 or GS 234 or equivalent.

Nature and causes of crime; methods of dealing with adult and juvenile offenders; consideration of present programs for the social treatment of crime in the light of needed changes.

553. THE SOCIOLOGY OF THE FAMILY.

Class 3, cr. 3. Must be preceded by SOC 100 or GS 234 or equivalent.

The family as a social institution, featuring its uniformity and variability in historical time and social space. Family institutions in preliterate, ancient, and modern cultures. Particular emphasis upon the development of the family in western European culture.

555. FAMILY LIFE EDUCATION. cr. 2 to 4.

Must be preceded by 15 hours from education, child development and family life, psychology, and sociology.

Designed especially for teachers and prospective teachers. Discussion of courtship, marriage, and family relationships. Special attention to methods and materials of instruction.

570. SOCIAL BASES OF EDUCATION. Class 3, cr. 3. Must be preceded by PSY 120 and SOC 100 or GS 234 or equivalent.

Sociological interpretation and evaluation of school and nonschool education.

44 • DESCRIPTION OF COURSES

SPEECH

Professor Monroe in charge

111. **PUBLIC SPEAKING.** Class 2, cr. 2.
(Offered only by the Division of University Centers.)

112. **PUBLIC SPEAKING.** Class 2, cr. 2.
Continuation of SPE 111 and must be preceded by it.

Credit in SPE 111 and 112 combined will be accepted in lieu of SPE 114 or 116 where one of the latter courses is required for graduation. Credit may not be earned in both SPE 114 or 116 and in the SPE 111 and 112 combination.

114. **PRINCIPLES OF SPEECH.** Class 3, cr. 3.

116. **FUNDAMENTALS OF EXPRESSION.**
Class 3, cr. 3. Required for teacher's license in English or speech.

210. **DEBATING.** Class 1, cr. 1. Admission by consent of the instructor only.

211. **APPLIED DEBATING.** Lab. 2, cr. 1, or Lab. 4, cr. 2. Admission by consent of the instructor only. May be repeated for credit, maximum total four credits.

321. **PARLIAMENTARY PROCEDURE.** Class 1, Lab. 1, cr. 1.

Principles and practice in the use of parliamentary procedure; order of business; nominations; elections; constitutions, amendments, and by-laws; committees and boards; motions.

325. **THE BUSINESS AND PROFESSIONAL INTERVIEW.** Class 3, cr. 3. Must be preceded by SPE 114 or 116.

Study and practice of methods used in business interviews, emphasizing logical and psychological bases of personal persuasion.

STATISTICS

351. **ELEMENTARY STATISTICS.** Class 3, cr. 3. Must be preceded by MA 111 and 112 or 121 and 122 or equivalent.

An introductory and preparatory course for both mathematical and applied statistics. Emphasis on underlying concepts and logic of statistical methods as well as on computational techniques.

352. **ELEMENTARY STATISTICS.** Class 3, cr. 3. Continuation of STAT 351.

501. **STATISTICAL METHODS.** Class 2, Lab. 2, cr. 3. Not open to students with credit in STAT 511.

Descriptive statistics for one and two variables of measurement; curve fitting, regression, and correlation; statistical inference through the simpler significance tests and estimation procedures.

502. **ADVANCED STATISTICAL METHODS.**

Class 3, cr. 3. Not open to students with credit in STAT 512. Prerequisite: A course in statistical methods or consent of the instructor.

Testing statistical hypotheses and estimating population parameters; analysis of variance; regression and correlation analysis, multiple regression, analysis of covariance; nonparametric tests.

SCHOOL OF INDUSTRIAL MANAGEMENT

Dean Weiler in charge

ECONOMICS

210.* **PRINCIPLES OF ECONOMICS.** Class 3, cr. 3.

Study of the basic economic institutions, such as business, labor organizations, banks, and government. Analysis of the effects of competition, monopoly, and government on allocation of resources in production and consumption; factors affecting size and growth of national income.

212.* **PRINCIPLES OF ECONOMICS.** Class 3, cr. 3.

Continuation of ECON 210. Emphasis on more thorough understanding of basic principles, and their application to solving economic problems.

370. **ELEMENTS OF ACCOUNTING I.** Class 3, cr. 3.

Management uses of accounting; analysis and recording of business transactions; procedure for internal control; preparation and interpretation of comparative financial statements.

* ECON 210 and/or 212 will not be substituted for ECON 213 required in mechanical engineering.

371. **ELEMENTS OF ACCOUNTING II.** Class 3, cr. 3. Must be preceded by ECON 370.

Continuation of accounting principles; special problems involving partnerships; accounting for corporation capital stock, surplus, cash stock dividends; bonds payable; manufacturing accounting, including a limited approach to cost methods, records, and statements; voucher system; installment sales; retail method of inventory; budgeting and executive control.

382. **ECONOMIC GEOGRAPHY.** Class 3, cr. 3.

Geographic factors determining production and industry in the principal regions of the world.

450. **LABOR PROBLEMS.** Class 3, cr. 3. Must be preceded by ECON 210, 213, or 310.

A beginning course in labor relations and industrial relations, with emphasis on the broad social aspects of employer-employee problems.

470. **LEGAL BACKGROUND FOR BUSINESS.** Class 3, cr. 3. Must be preceded by ECON 210, 213, or 310.

Nature and place of law in our society;

social and moral bases of law enactment, regulation of business, legal liability, and enforcement procedures. Special emphasis on contracts.

514. **BUSINESS CYCLES.** Class 3, cr. 3. Must be preceded by ECON 210, 213, or 310.

Why we have booms and depressions and what to do about them.

520. **GOVERNMENT AND BUSINESS.** Class 3, cr. 3. Must be preceded by ECON 210, 213, or 310.

Problems of government control and regulation of business in various branches, together with the ruling of courts in respect to the activities of government.

551. **INTERMEDIATE LABOR ECONOMICS.** Class 3, cr. 3. Must be preceded by ECON 450, 550, or by consent of the instructor.

Study of the literature in the field of labor.

553. **LABOR LAW.** Class 3, cr. 3. Must be preceded by ECON 450 or by consent of the instructor.

Court decisions in respect to labor.

INSTRUCTIONAL STAFF

- WALTER F. ADE (1959)....Assistant Professor
of Modern Language
(Calumet Center)
B.A., Queens (Canada), 1933; M.A., Toronto
(Canada), 1939; B.PAED., M.Ed., 1942;
M.S., Ed., Indiana, 1959; Ph.D., North-
western, 1946.
- CONSTANTIN ARDLEANU (1957)...Lecturer
in Modern Language (Calumet Center)
B.A., Commercial Academy (Bucharest, Rou-
mania), 1943.
- ETHELWYNE G. ARNHOLTER (1959).....
Lecturer in Psychology (Marott Center)
B.A., Butler, 1945; M.A., Indiana, 1951;
Ph.D., Purdue, 1953.
- CHARLES A. BARNABY (1957).....Lecturer
in Mathematics (Fort Wayne Center)
A.B., Amherst, 1954.
- LEO BERELOS (1958).....Lecturer in Physical
Education for Men (Calumet Center)
A.B., Indiana, 1947.
- CHARLES J. BELLAVIA (1954)....Lecturer in
Psychology (Fort Wayne Center)
B.S., Boston, 1939; M.A., Illinois, 1948; Ph.D.,
Purdue, 1951.
- DAVID L. BLUMENTHAL (1954)....Lecturer
in Sociology (Marott Center)
B.S., Purdue, 1948; A.M., Chicago, 1949.
- GEORGE E. BOCK (1957)...Assistant Professor
of Mechanical Engineering
(Calumet Center)
A.B., Columbia, 1922; M.E., 1924.
- HAROLD G. BOESE (1947).....Lecturer in
Zoology (Marott Center)
S.A.T.C., Northwestern, 1918; Ph.B., Ripon,
1921.
- ANITA O. BOWSER (1956).....Instructor in
History and Government (Barker
Memorial Center)
A.B., Kent State, 1945; LL.B., William Mc-
Kinley School of Law, 1949.
- ANTHONY F. BRODNICKI (1958)....Lecturer
in Civil Engineering (Fort Wayne Center)
B.S.M.E., Illinois, 1958.
- HENRY E. BROMER, JR. (1957).....Lecturer
in Chemistry (Marott Center)
A.B., DePauw, 1944; M.A., Michigan, 1948.
- JOHN W. BUCK (1951).....Lecturer in
Sociology (Barker Memorial Center)
B.S., Purdue, 1940; M.A., Chicago, 1940.
- ROBERT F. BUNDE (1959).....Instructor
in Physics (Marott Center)
B.S., Western Michigan, 1950; B.S.Ed., Mich-
igan, 1955; M.A., 1959.
- ALDA J. CARSON (1948).....Lecturer in
English (Fort Wayne Center)
A.B., Indiana, 1920; A.M., Teachers College,
Columbia, 1933.
- WILLIAM M. CATRON (1958).....Lecturer
in Mathematics (Marott Center)
B.S.E.E., Purdue, 1948.
- J. HAL CARTER (1947).....Professor of
Chemistry (Fort Wayne Center)
A.B., Union, 1925; M.S., Vanderbilt, 1927;
Ph.D., Iowa State, 1931.
- WILBUR W. CHAMBERS (1947)....Instructor
in Mathematics (Marott Center)
A.B., Colorado State, 1925; M.A., 1926.
- ALICE G. CHELICH (1958).....Lecturer in
Physical Education for Women
(Calumet Center)
B.S., Northwestern, 1954.
- ALLEN G. CLEAVER (1948).....Instructor
in Engineering Drawing
(Fort Wayne Center)
B.S., Indiana State Teachers, 1927.
- CORAN L. CLUFF (1959).....Instructor in
Chemistry (Fort Wayne Center)
B.S., Arizona State, 1952; M.S., Michigan,
1955; Ph.D., 1959.
- L. WINSTON CONE (1948).....Associate
Professor of History (Calumet Center)
B.S., Massachusetts, 1938; M.A., Illinois, 1946;
Ph.D., Chicago, 1950.
- VIRGINIA W. CONE (1953).....Instructor in
History and Government
(Calumet Center)
B.A., Illinois, 1943; M.A., 1946.
- PETER D. COUCH (1959).....Lecturer in
Psychology (Marott Center)
A.B., Illinois, 1953.
- HELEN L. CRISWELL (1946).....Assistant
Professor of English (Fort Wayne Center)
A.B., Hiram, 1924; M.A., Butler, 1950.
- HAROLD W. CROWDER (1950).....Associate
Professor of Biological Sciences
(Fort Wayne Center)
B.S., Oklahoma State, 1932; M.S., 1940; Ph.D.,
Kansas, 1950.
- WILLIAM E. CUTTILL (1956).....Lecturer
in Mathematics (Marott Center)
B.S.E.E., Illinois, 1941.
- ANTHONY R. D'ABBRACCI (1959).....
Instructor of Physics
(Barker Memorial Center)
A.B., Indiana, 1954; M.A., 1957.
- JOHN J. DEELY (1958).....Instructor in
Mathematics (Fort Wayne Center)
B.E.E., Georgia Institute of Technology, 1955;
M.S., Purdue, 1958.
- JOHN H. DEITCHE (1959).....Lecturer in
Psychology (Fort Wayne Center)
B.S., Indiana, 1951; Ph.D., 1959.
- GLEN D. DEVORE (1957).....Lecturer in
Mathematics (Marott Center)
B.S.E.E., Illinois, 1949.
- AUGUSTUS I. DHAR (1958).....Assistant
Professor of Physics and Mathematics
(Calumet Center)
M.S., Lucknow (India), 1947; LL.B., 1950;
M.A. Vanderbilt, 1954.
- RITA M. DIEDAM (1957).....Instructor in
English (Fort Wayne Center)
B.S., Purdue, 1947; M.S., 1957.

- PHILIP A. DILLABER (1959).....Lecturer in
Economics (Barker Memorial Center
and Calumet Center)
B.A., American International (Massachusetts),
1949; M.B.A., Indiana, 1955.
- BERNARD DOLNICK (1957).....Lecturer in
Psychology (Fort Wayne Center)
B.A., Chicago, 1939; M.B.A., 1949.
- WILLIAM A. DREW (1958).....Lecturer in
Mathematics (Fort Wayne Center)
B.S., California Institute of Technology, 1948.
- ROBERT J. DWYER (1956).....Assistant
Professor of Physics (Calumet Center)
B.A., Cincinnati, 1929; M.A., Harvard, 1937;
Ph.D., 1941.
- WILLIAM FAHLE (1959).....Lecturer in
Mathematics (Marott Center)
B.A., Marian College, 1957.
- JAMES L. FATTORE (1959).....Lecturer in
Economics (Calumet Center)
B.S., DePaul, 1949; M.B.A., 1951.
- HARLAN D. FAYLE (1956).....Assistant
Professor of Chemistry (Calumet Center)
B.A., Hamline, 1931; M.S., Minnesota, 1932.
- DAVID M. FISHER (1958).....Instructor in
Speech (Fort Wayne Center)
B.S., Utah, 1940; M.S., Ball State Teachers,
1958; M.A., 1959.
- LOYAL W. FISHER (1954).....Associate
Professor of Biological Sciences
(Fort Wayne Center)
B.S., Purdue, 1918; Ph.D., 1931.
- *GOLDEN A. FLAKE (1947).....Assistant
Professor of Physics
(Marott Center)
B.Ed., Eastern Illinois State Teachers, 1933;
M.S., Northwestern, 1946.
- P. VINCENT FLANNERY (1947).....Assistant
Professor of Physics (Calumet Center)
B.S., St. Mary's (Canada), 1939; M.S., Ford-
ham, 1942.
- JOHN J. FLYNN (1958).....Instructor in
Chemistry (Fort Wayne Center)
B.A., Western State (Colorado), 1953; M.S.,
Oklahoma State, 1955.
- EDWARD C. GALLETT (1954).....Instructor
in Engineering Drawing
(Calumet Center)
B.S.M.E., Illinois Institute of Technology,
1947.
- WILLIAM L. GARBRECHT (1957).....Lecturer
in Chemistry (Marott Center)
A.B., Kalamazoo, 1948; M.S., 1949; Ph.D.,
Michigan State, 1953.
- JAMES E. GETZ (1957).....Lecturer in
Mechanical Engineering (Calumet Center)
B.S.M.E., Illinois Institute of Technology,
1951; M.S.M.E., Purdue, 1952; Ph.D., 1954.
- LOWELL C. GIBSON (1958).....Assistant
Professor of Chemistry
(Calumet Center)
B.S.Ch.E., Illinois, 1943; M.S.Ch.E., Wisconsin,
1949; Ph.D., 1952.
- WILLIAM E. GIBSON (1954).....Lecturer in
Mathematics (Marott Center)
B.S. Purdue, 1950; M.S., Indiana, 1953.
- GEORGE T. GIFFORD (1957).....Assistant
Professor of Chemistry (Marott Center)
A.B., Indiana, 1932; M.S., Georgia, 1955.
- FRANCES M. GOURLEY (1948).....Lecturer in
Zoology (Barker Memorial Center)
B.S., Illinois, 1935; M.S., 1940.
- KATHERINE W. HACKER (1950).....Lecturer
in Sociology (Fort Wayne Center)
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48 • STAFF

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INDEX

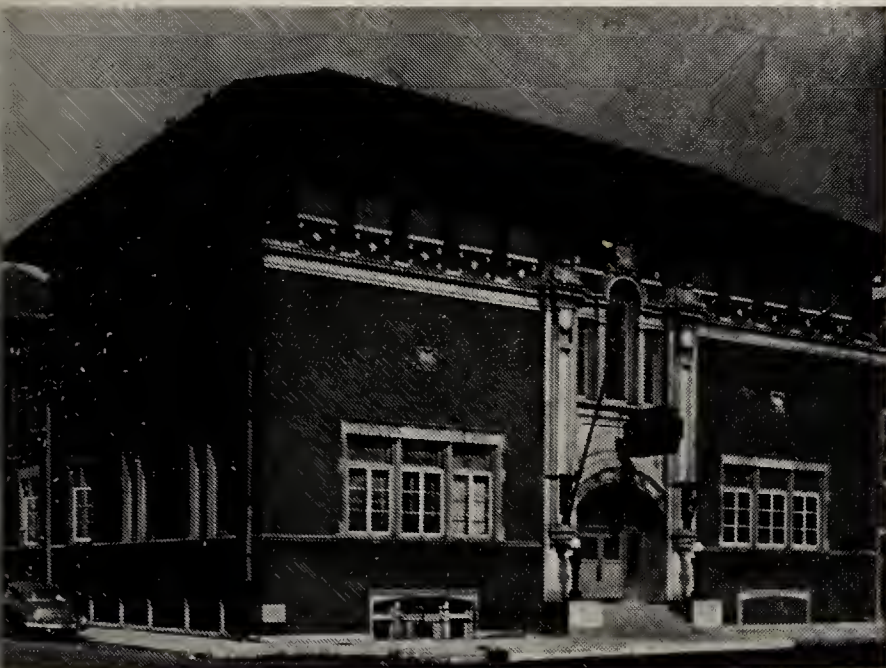
Abbreviation key	13	Industrial education option	23
Addresses, university centers.....	OBC	Industrial engineering, department of.....	30
Administration, officers of.....	2	Industrial management, school of	44
Admission		Institutional management, courses in.....	31
deficiencies	8	Instructional staff	46
requirements	7	Mathematics, courses in	38
Agricultural economics, course in.....	28	Mechanical engineering, school of	30
Agriculture, school of	28	Metallurgical engineering, school of.....	30
Agronomy, courses in	28	Military training	12
Animal science, course in.....	28	Modern languages, courses in.....	39
Art and design, course in.....	31	Noncredit courses	6
Bachelor of Arts	18	Nontechnical program	14
Bacteriology, courses in.....	33	Off-campus program	6
Biological sciences	33	Pharmacy, school of.....	31
Biology, courses in.....	33	Philosophy, course in	38
Calendar, university	IFC	Physical education, courses in.....	40, 41
Chemical engineering, school of.....	28	Physics, courses in	41
Chemistry, courses in	34	Placement examinations	9
Child development and family life, courses in	31	Plans of study	13
Civil engineering, school of.....	29	agriculture	25
Clothing and textiles, course in.....	31	engineering	13
Correspondence study	12	home economics	27
Dairy, course in	28	industrial management	23
Degree credit courses.....	6	science, education, and humanities.....	18
Department representatives	5	Plant sciences, courses in.....	33
Description of courses.....	27	Probation, scholastic	10
Distinguished students	10	Psychology, courses in	42
Economics, courses in	44	Recreation, courses in	41
Education, courses in	34	Refunds and withdrawals.....	12
Electrical engineering, school of.....	29	Requirements for admission.....	7
Elementary education option	22	Russian, courses in.....	40
Engineering sciences, division of.....	30	Scholarship index	10
Engineering	13	Scholastic probation	10
English, courses in	36	Science, education, and humanities, school of	33
Entomology, course in	28	Sociology, courses in	43
Entrance requirements	7	Sophomore work	6
Equipment and family housing, courses in..	31	Spanish, courses in	40
Examinations, placement	9	Special services for industry.....	6
Fees	11	Speech, courses in	44
Foods and nutrition, courses in.....	31	Statistics, courses in	44
Forestry, course in	28	Students	
French, courses in	40	distinguished	10
Freshman engineering	28	engineering	11
Freshman work	6	temporary	8
German, courses in	40	transfer	9
Government, courses in	38	Study, correspondence	12
Grades and honors.....	9	Study, plans of	13
History, courses in	37	Teaching staff	46
History, government, and philosophy, courses in	37, 38	Temporary students	8
Home economics, school of.....	31	Termination	11
Home management and family economics, course in	31	Transfer students	9
Horticulture, course in	28	University extension council.....	4
		Withdrawal	12
		Zoology, courses in	33



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